

In This Issue—Need of Organization in Business

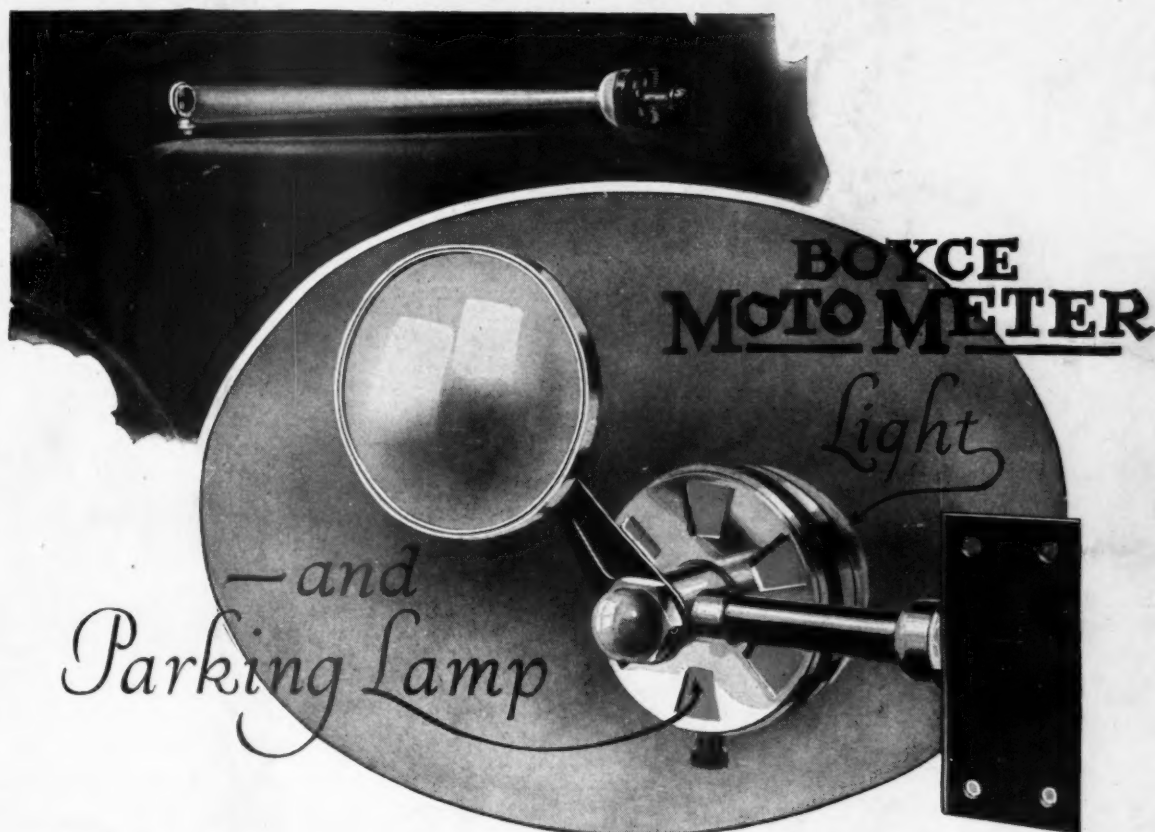
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MOTOR AGE

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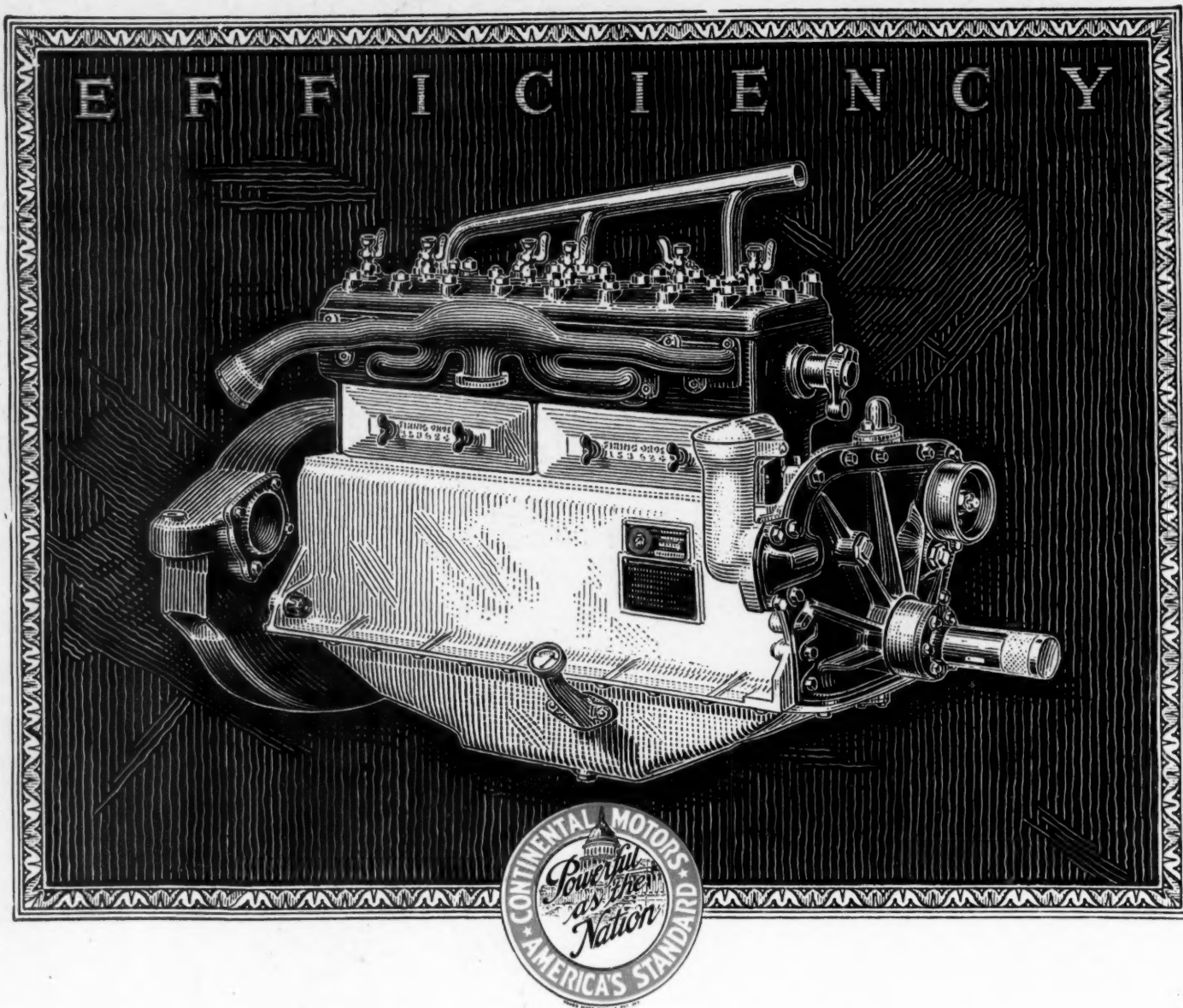
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MOTOR AGE

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MOTOR AGE

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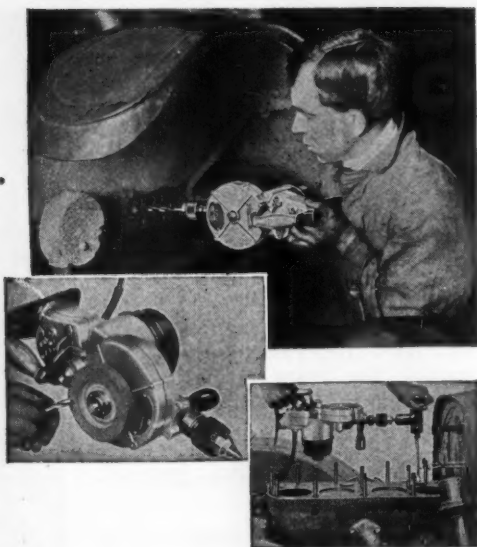


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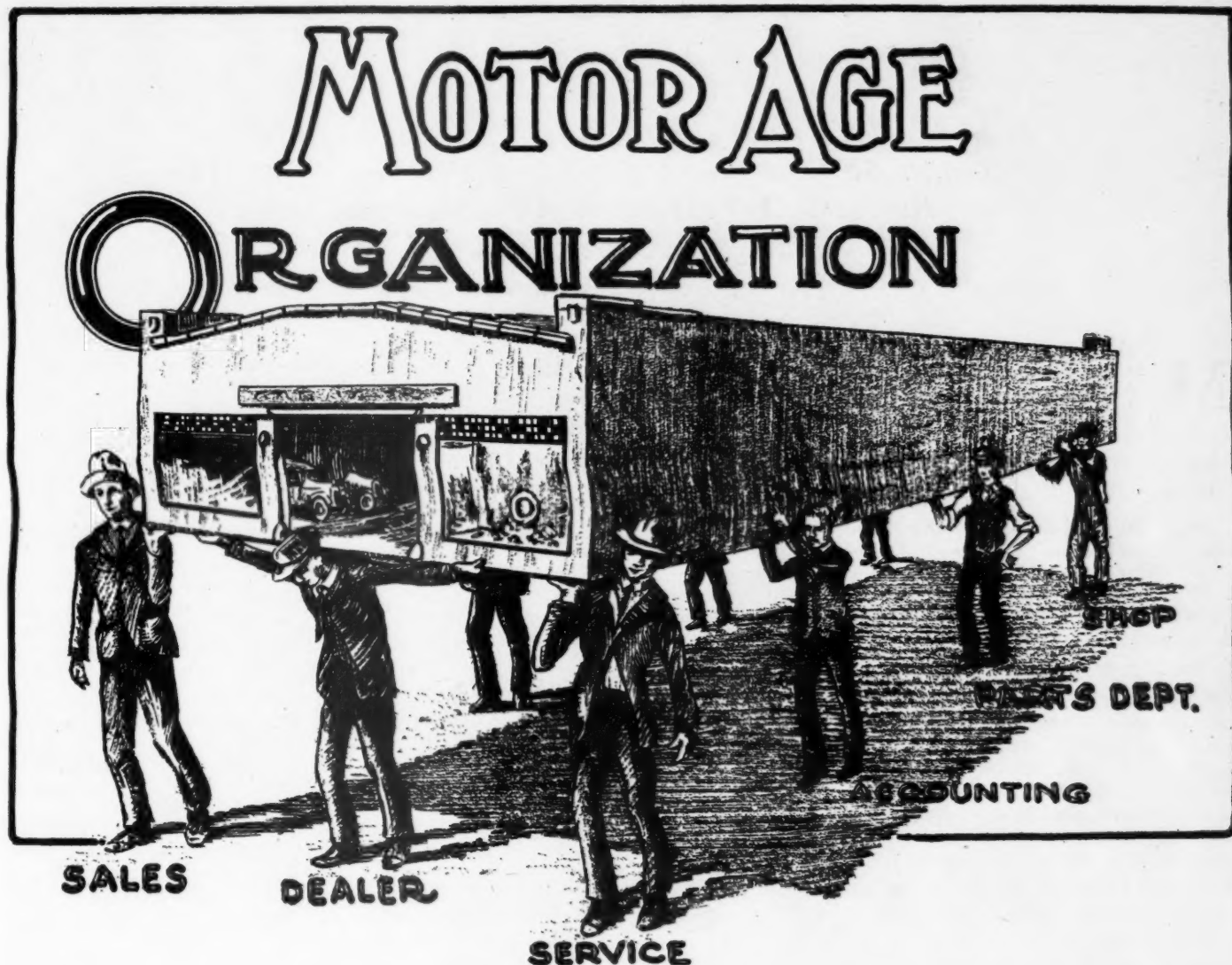
—undeniably a case of good judgment, for, in order to render the greatest service, every part of such a tool must be the best obtainable—and the chuck is by no means the least of these.

The Temco Garage Outfit—Drill, Valve Grinder, Emery Wheel—a machine shop in itself, has found a most welcome response in shops of every size, everywhere. The uniformly good results obtained are due, in a large measure, to the ease with which drills and tools are changed, and help while operating.

—and Jacobs Quality Chucks have made this possible.



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Hartford, Conn., U. S. A.



Every Individual and Every Department Must Carry Its Share of Business

AMONG the more immediate things necessary in the industry today is a proper understanding and realization of the fundamentals that govern any well conducted business. And, when these are realized, there will be better organization in our retail establishments.

There will be organizations operating the same as those in other lines of business, dry goods, groceries, hardware or drugs.

Ours is the only industry in which prevails many obsolete ways of doing business. If we are to succeed we must unlearn a lot of things that have been hanging over from the early days of the business.

We have allowed the public to think of us as "holdups and gyps." We have let prevail unrestricted the thought that our salesrooms must be our parlor in which to meet the customer, and anything would do for a service department. We have

allowed ourselves to think that the salesmen always will hate the boys in the shop, or vice versa; that mechanics and service men always must be dirty and greasy, and that what the average car owner thinks when he hears the name garage or service station would not look well in these columns.

The above illustration shows one thing to be done. Not only the dealer, but those in the sales department, service, parts, accounting, shop and elsewhere must be made to realize they are carrying a certain amount of the load of business. Each must assist the other. If one falls down on the job it will be noted by the others. On the other hand, a little extra effort by one or all will help.

As the individual helps himself, so will the department be helped; as the departments prosper, so will the institution prosper. Every institution has an objective of some kind which only can be attained by organization.

What the Dealer's Business Needs Is ORGANIZATION

Individual Necessary to Institution. As the Individual Prospers So Will the Organization Prosper. Ours Is Only Business Adhearing to Old Methods. Many Things Must Be Unlearned

By B. M. Ikert

MUCH that is common in the service end of the automobile business must be swept out of existence if the business ever expects to gain respect from the buying public.

Some of the individuals who have been in the business many years—and there are plenty of them—have got to unlearn a lot of things.

In this business the time has come for a great house-cleaning.

Those who have for years carried on the business of selling and servicing automotive vehicles are alone responsible for the way in which public opinion has been molded against the average automobile dealer's business. And the men now in the business are the only ones to mold this opinion in such a way that the industry might gain the favor of the public, as any other legitimate business has done.

It is a pity that such a remarkable piece of machinery as the modern motor car—a piece of machinery that has changed our very mode of living, has linked city and country together, made possible the construction of thousands of miles of good roads, has become one of the most important economic factors in our existence—should be merchandized and serviced in such a manner that citizens, and especially car owners, are more or less suspicious when they enter a salesroom or service department.

FUNDAMENTALS GOVERNING BUSINESS DISREGARDED

The great difficulty in the past has been that those engaged in the selling and servicing of automobiles have not properly grasped the fundamentals governing the operation of any business, whether it be automobiles or sewing machines.

If the automobile business, generally speaking, were operated on the same basis as any other legitimate business we should not find the newspapers of the country making fun of it through the medium of cartoons.

One thing, of course, this industry is not as old as most of the other lines. There are many lessons to be learned. Just before the war came on there was a strong movement made by the industry at large to put itself on a better basis with other well-established lines. The time again has arrived when this movement must be given impetus.

But the greatest job ahead is that of organization itself. It makes little dif-



Let the customer or any other individual think of the term garage or service station and here's what he generally pictures to himself

ference whether yours is an institution of five floors or one floor, or whether you employ three hundred or three men—unless the business is organized right, little good will be done and the job of getting the industry to a point where it will be respected in the eyes of everyone simply will be pushed farther ahead.

We have said that many in the business do not know the fundamentals of it—those subtle things which make one man succeed and the other fail, although both might start out under the same conditions. During the last year there have

been many dealers who have gone out of business. There are many today only too anxious to do the same thing. Why? Principally because they do not understand fundamentals.

There are, of course, a good many dealers in this country who are excellent business men and who have organizations functioning almost perfectly. But one will always find that these men have a thorough understanding of business management. Not only that, but they understand that in the automobile business, like any other business, there is a point of contact with the public, which if not intelligently handled means sooner or later the downfall of the business.

Dealers speak of their "organizations" when in reality they are unorganized, although they have quite a personnel. Given a building, salesmen, service men, executives, clerks, stenographers, mechanics and greasehounds, what, then, is to be desired in an organization whose business it is to serve the public?

Organization, for one thing, begins with the individual. Every individual has a special function. He bears a definite relation to the whole. Yet every individual must understand exactly where he fits into the organization and get the correct perspective. He must know not only his own work, but its relation to the work being done by others in the institution. This is a condition which, unfortunately, has been lacking in most automobile organizations.

Thus we find the parts department cussing the mechanics and the mechanics cussing the salesmen, and so on. Or, the foreman of the shop does not take an active interest in work being done by his men and tells them "fix it any way you want." There is no unanimity of purpose in an organization run on that kind of a basis.

COOPERATION BETWEEN SERVICE AND SALES STAFF LACKING

Go into the average automobile establishment and you are pretty sure to find the salesmen making excuses for their service department. They agree with the customer when he complains. It's

the old story of "can't get good men," etc. The little grease hound away back in the shop is looked upon with contempt by others in the organization, probably because no attempt ever has been made to see just where he fits into the organization. He is just as much a salesman as any other individual in the institution.

Suppose, for example, he leaves a gob of grease on the steering wheel of a customer's car and the customer soils his hand or glove when he takes the car out. A future sale probably is ruined right there. On the other hand, if that same grease hound takes pride in his work and does it faultlessly, he becomes an asset to the house and sooner or later betters his own position. Yet, in the position of grease hound he is not the man to meet the public, and organization will see to it that he does not do so. No one expects the dishwasher in a first-class hotel to serve at the tables, yet the dishwasher is very essential to the hotel. The management keeps him out of sight.

It so happens that in the automobile business many of the dealers came from the ranks of mechanics, and few of them have attained the poise necessary to meet customers properly. Not that mechanics do not make good dealers. There are plenty of instances where such men are making good, especially where they have mastered the fundamentals of good business. But, too many never have been able to leave the monkey-wrench alone and in its place wield a pen that signs the pay checks for the others in the organization. In other words, they have not become executives. And here is one of the greatest essentials in the business today—men who can plan and execute. What is needed are men not afraid to undo many of the things which have gone before and which the customer has taken for granted all these years.

For example, there is the item of cleanliness. Let any man or woman think of the term garage or service station and ninety-nine times out of a hundred they think of dirt and grease. Let the same people think of a drug store, grocery store or a bank and the thought of dirt or grease is remote from their minds.

WELL DEFINED CODE LACKING

Most of us have yet to learn that the automobile service station is selling a product the same as the drug store, the grocery store, or the bank. But these institutions have traded with the public for years and know how to handle people. They know all the subtleties that go with good business. They have a well defined code of ethics—something lacking in many automobile establish-

ments. No matter how large a service station a dealer might be operating he cannot sell service right unless he is organized. We previously have mentioned something about the grease hound who left a gob of grease on the customer's steering wheel. The right kind of an organization would have seen to it that someone somewhere in that institution would have discovered the gob of grease before the car was turned over. It might have been the shop foreman, the service manager or anyone else, but someone must represent the customer and demand that the car be properly put into shape. You do not expect a suit of clothes to come back from the tailor with stains upon it after he has sewed up a torn pocket. Neither should a customer expect to have his car returned in a messy condition after a repair operation has been performed on it. Proper delivery of the goods goes with any well-conducted organization.

What One Service Manager Says About Organization

I WOULD hate to think that a barber shop is a better organized place of business than an automobile dealer's or distributor's service station. Everybody pays the same price for a hair cut, regardless of the fact that some men are bald-headed.

What the owner does pay for, is the ability of the service station to perform a given operation at a given price, which is based on the length of time required for that operation on a car in normal condition—neither good nor bad, but normal. That, however, requires machinery, tools and equipment, also an experienced organization, for which the owner must pay and for which he is more than willing to pay. **AS AN ORGANIZATION OF THIS KIND INSPIRES CONFIDENCE ON ACCOUNT OF ITS RELIABILITY.** The public always prefers to spend its money with reliable concerns.—A. G. Properi. Service Manager, Southern Oakland Co., Atlanta

There is something else that goes with a good organization, and that is delay. There are times when the customer must wait, the same as he does in any other line of business. Suppose your business is run on a cash basis and the customer says he has not time to wait for his bill. What happens? You let him go out and say, "All right, Mr. Smith, we will mail you the bill." You break the rules of the house and in addition have lost the respect for your business of Mr. Smith. Any right thinking man or woman is used to delay. We stand for half an hour at the theater waiting in line to buy tickets. We line up at the bank window. We wait at the hardware store until the clerk gets through with some other customer. Yet when a customer comes into your service station and starts a row about the lack of system while your clerks are making out his bill, talk to him about the theater, the bank or the dry goods store. The industry never will gain the respect of the public until it is sold on this fact.

Organization means that the inter-department spirit is right. Unless every department takes its share of the load, the organization gets nowhere. It might make some money, to be sure, but all the time resistance is being built up. Those who have organized have shown every person in the institution what a vital necessity they are. One insolent remark in the service department, or a sarcastic expression from an employee at the time the customer is paying a bill, may undo months of hard work on the part of a salesman who is trying to sell the customer a new car. Often an entire organization is condemned on the single remark of one employee.

WHERE ORGANIZATION BEGINS

Probably one of the greatest things confronting many in the business just now is where to begin to organize. One dealer recently stated that he thought the best thing he could do was to get

some good executive to run his business. This dealer hardly talked intelligently. He was dressed more like a mechanic than a man representing a high-class car. His place of business was typical. Dirty floor, oil barrels in the doorway, no place for women drivers to rest, men smoking cigarettes—just plain confusion. No wonder he said he was about through with the "game." He ought to be through with it. He never belonged in it.

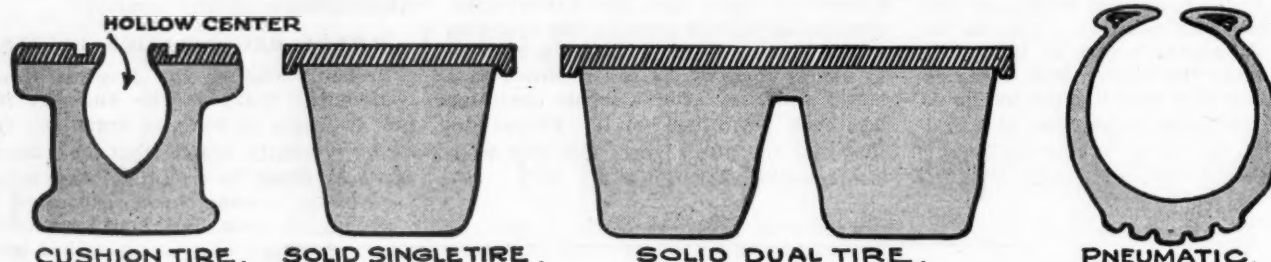
Organization in the future is going to mean the unlearning of many things we have accepted in this business as a matter of course. Take the case of buildings. We know of one case where a dealer spent thousands of dollars for a building with beautiful salesrooms, yet in

the service department were the same old rafters and unpainted walls, and in the shop he installed only two wash basins for the men, whereas he should have at least ten to insure the men's getting washed up and home to their meals in time without having to stand in line for a long time. This dealer must not wonder later on if the men in his shop are not strong for the organization. All the wonderful salesroom equipment may be lost by the resistance built up in the shop, which eventually will get to the customer in some form or other. This dealer lacked perspective. He did not get a bird's eye view of his business. He saw only the immediate sales in his salesrooms.

Motor cars are largely going to be sold from the back doors of the establishments in the next few years, and it therefore would be an excellent thing for those about to start in this business and those in it now to make sure their houses are in order.

Deciding the Proper Tire Equipment for Each Truck Use

This Article Discusses the Different Designs of Tires, to Assist the Dealer in Recommending Proper Type to Meet Owner's Needs



MANY motor truck buyers and owners frequently ply truck dealers and tire manufacturers with the question:

"What is the proper tire equipment for my truck?"

And that is a question each truck dealer can answer, provided he first acquaints himself with the different types and kinds of motor truck tires, and provided also that he studies carefully their respective merits and fields of usefulness and adaptability.

We all have heard the random speculation that "nearly half the trucks of the country are operating on the wrong kind of tires." But that is a statement whose accuracy cannot be checked, nor even closely arrived at except through the merest kind of guess-work, for the proper motor truck tire equipment depends preponderately upon the conditions under which each truck operates.

In many instances and under certain circumstances the pneumatic truck tire may afford the ideal tire equipment. Under other conditions the solid truck tire may have a distinct advantage, while again the hollow-centered cushion tire may be more distinctly valuable, depending upon the kind of haulage work done, and various other important factors to be subsequently named.

Before the truck dealer can obtain any clear-cut idea of the proper type of tires for the truck being sold, he must grasp the fundamental and underlying elements upon which the ultimate or ideal tire equipment naturally depends. There are five distinct aspects of this problem, all of which need careful classification.

First is the classification of hauling which is subdivided into

- (1) Congested city hauling.
- (2) General city and suburban hauling.
- (3) Rural hauling.
- (4) Inter-city hauling.

Next must come a classification of

Useful Information

THERE is current a startling degree of misconception as to the difference between the solid truck tires and the cushion type. This, perhaps, is due in part to the practice of some tire makers of adapting the non-skid tread to solids and designating them as cushion tires.

This article is intended to clear away much of the confusion in the minds of dealers selling trucks and assist in specifying the proper equipment for the needs of each truck buyer.

Whether you sell trucks or not, it will be worth your time to read this article and be informed on the subject.

truck capacity; third, the business classification; fourth, the operating conditions; and fifth, the individual point of view of each truck owner as to the desirable qualities in tires to be preferred under his particular business, haulage and operating conditions. In this last aspect the truck dealer in arriving at a conclusion must consider cost of original equipment, ultimate cost, or cost per tire mile, traction, cushioning medium desired, reliability, renewal service, facilities and power absorption.

THE CUSHION TRUCK TIRE

Every truck dealer is acquainted with the pneumatic and solid truck tires, but a great many are confusing the solid and cushion tire, due to the fact that many new designs of solid truck tires equipped with pneumatic treads, have been conveniently termed "cushion tires."

It is important to get a clear definition of "cushion tires" in mind, and be able to make a clean-cut distinction be-

tween cushion and solid tires, before determining the ideal truck tire equipment.

The original cushion tire has a hollow center. Its main composition is the same as that of the solid rubber tire, with the exception of the hollow center, and a slightly different build. But where the cushioning medium of the solid tire decreases with the tire depreciation through road wear, the cushioning medium of the cushion tire remains practically constant during the natural life of the tire. This gives the cushion tire a cushioning and shock absorbing quality at least half way between those of a solid tire and a pneumatic tire, and therefore gives the cushion tire perhaps a wider field of usefulness than either the pneumatic tire or the solid tire.

The confusion existing in the minds of many as to a cushion tire, has arisen largely through some tire manufacturers adapting non-skid tread patterns to solid tires, and marketing them under the designation of "cushion tires." In reality these tires have only slightly greater cushioning qualities than the regular solid tires, due to the tread application, and lose these cushioning qualities as soon as the tread portion is worn away.

With this distinction therefore made clear, we come to the fundamental suggestions as to tire equipment based upon respective haulage, operating radius and road conditions.

If the truck owner is hauling fragile or perishable material; if speed and distance are essential elements in his truck transportation work; and if road conditions are not the best, the pneumatic truck tire affords him a distinct advantage over the other two types.

THE PNEUMATIC TIRE

There is no better cushioning medium than air. And the pneumatic truck tire not only permits greater flexibility through its inflation with air, but has

far greater resiliency. It permits greater speed. It irons out the bumps in bad roads. It absorbs the shocks otherwise concentrated upon the truck chassis. And it protects the load from hard jars, thus avoiding possibility of breakage where fragile material is being trucked. The non-skid pneumatic truck tire has far superior traction, which under bad road conditions, is a vastly important factor. Absolute demonstrations have proven that the pneumatically tired truck has nearly twice the operating radius of the solid tired truck, and this also is important where speed and distance are essential elements in truck transportation.

THE SOLID RUBBER TIRE

If the truck owner is operating heavy duty trucks where there are limitations of load, speed and body clearances, where speed is not essential, and where roads are good, the solid truck tire or the dual-solid tire is distinctly advantageous over the pneumatic, for it naturally has a longer life than the pneumatic tire, but less cushioning medium and flexibility. The solid tire admittedly is preferable for slow heavy trucking either in cities where paved streets are available, or between cities where well built paved highways likewise are available for travel.

But if the truck owner desires a happy medium between the two—if he wants greater speed and flexibility than is per-

mitted by the solid tire, and yet must operate his truck under conditions not wholly suitable for the pneumatic tire, the hollow-centered cushion tire naturally affords him the best equipment. The hollow center of the cushion tire is egg-shaped, with concave sides which flex easily. The life of the cushion tire equals that of the solid, and yet there is the distinct advantage of the cushioning medium of the cushion tire continuing without being diminished, throughout the natural life of the tire, whereas the cushioning medium of the all-solid tire decreases as the tire wears down.

Hollow-centered cushion tires, under severe tests, have yielded an average of 15,000 miles, while there are records of 30,000 and even 80,000 mileage performances by cushion tires.

The cushion tire has another and distinctly individual field of usefulness. It not only is considered the ideal equipment for light trucks irrespective of road conditions, but has proven beneficial as the front wheel tire equipment for heavy duty trucks whose rear wheels are equipped with solid tires.

There are approximately 30,000 motor trucks in use in the United States. Twenty per cent of these, it is estimated, are operating on pneumatic tires. Seventy-five per cent are operating on solids and perhaps five per cent on cushion tires.

It is only guess work in saying that 50 per cent of these trucks should be on solids, 35 per cent on cushions and

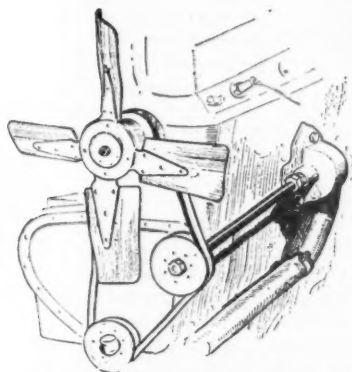
15 per cent on solids. These percentages easily could be revamped without coming any nearer to the speculative answer.

But it is safe to say that if half of the trucks now traveling on solids, were using either pneumatics or cushion tires, the field of usefulness of those trucks would be improved, their operating radii would be largely increased, their operating costs would be reduced, and roads would not be worn down so rapidly as they are now through the heavy pounding of the non-resilient, worn-down solid tires on heavy duty trucks.

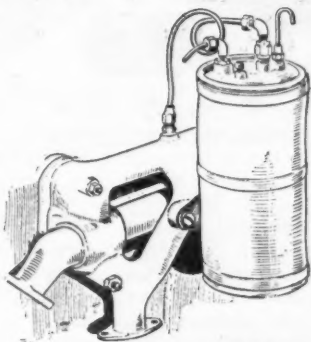
Development and more extensive use of the pneumatic tire on motor trucks, depend almost entirely upon extension of service facilities. To date, there has been no development of uniform service facilities for users of giant truck pneumatic tires. There are inadequate facilities for provision of heavy enough air pressure to inflate the mammoth tires, while repair facilities also are inadequate.

Perhaps the time will come when these facilities will be properly developed, and when motor truck builders will make provisions for the carrying of a spare tire, and for a pump attachment so that the driver can inflate his tires on the roadside from his own engine power. If these developments ever come, it is certain that the pneumatic tire faces an era of supremacy as the ideal and ultimate tire equipment for motor trucks.

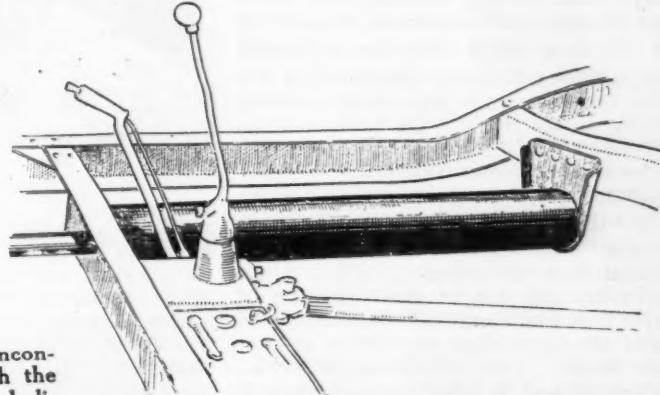
Some Constructional Details of the New Durant Four



The water pump of the new Durant four is mounted partly within the water jacket. A triangular belt arrangement drives both the fan and water pumps



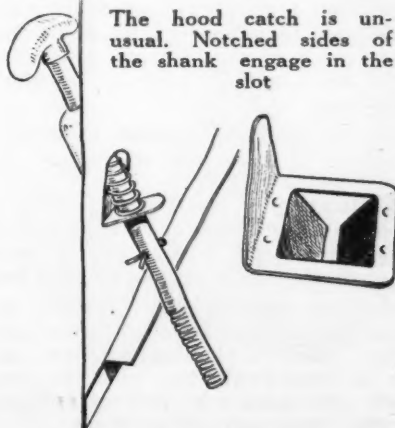
The manifold is of unconventional design with the vacuum tank mounted directly on it



The torsional tube does double duty. Besides adding to the rigidity of the frame, it also serves as a muffer. No baffle plates are used in this muffer

THE hood catch used on the new Durant four is of novel design. The handle is a Tee-fitting, the shank of which extends through an opening in the hood and is provided with saw tooth slots on opposite sides at its lower end. Two sides of the shank are left smooth. Secured to the frame side members are catches of hardened steel which engage into the slots of the shank when the catch is locked. To open the catch, press down slightly on the Tee-fitting, turn through a quarter circle and pull out. Sketch at right shows its construction.

The chassis is designed around the idea of a rigid frame that will have the



The hood catch is unusual. Notched sides of the shank engage in the slot

minimum amount of weave. The torsional tube shown not only serves the purpose of eliminating frame weave but also serves as a muffer. There are no baffle plates in this muffer and no tail pipe, the rear end of tube being covered with a plate which has a louvered opening at the bottom.

At the left is shown the triangular belt arrangement for driving both fan and water pump. The water pump has one peculiarity in that it is mounted partly within the water jacket.

The vacuum tank is mounted directly on the manifold. The manifold is of unusual design, as is shown above.

Bosch Has New Ignition System

Apparatus Characterized by Ease with Which Parts May Be Disassembled

FOR many years the Bosch magneto has been known to those in the automotive industry. Now Bosch comes out with a battery ignition system, comprising a timer-distributor and coil. Two types are available—types "T" and "TM."

Type "T" is known as the Bosch compensating system and includes a governor which operates a cam so that, in accordance with the engine speed and characteristics, the exact corresponding "advance" is given the ignition spark, thereby compensating for the variable advance required under different operating conditions.

Type "TM" is identical in general detail with type "T" but differs in that the compensating feature is not included, and the "advance" is subject to the customary manual control.

Both systems use the jump spark method of current distribution, and are provided for 4, 6 and 8-cylinder engines.

Each outfit consists of five distinct units: main housing, interrupter cup, compensating feature, distributor, ignition coil.

The main housing or shell, the lower end of which also constitutes the bearing for the timer shaft, is a fine, soft gray iron casting, carefully machined to receive the interrupter cup which rests in the upper section.

Type "T" incorporates sufficient depth in its shell to accommodate the governor mechanism and is, therefore, of greater height than the manual advance housing, or type "TM."

Ventilation is essential in all jump spark systems due to the formation of nitric acid gas when high tension sparks occur for any length of time in an airtight space. The ventilation of the interrupting and distributing mechanism is accomplished by fastening the spring clips with tubular rivets.

The timing arm for manual advancement or retardation may be clamped in any angular position desired.

By moving the main housing, the angular position of the interrupter cup and the distributor cap mounted thereon is changed in relation to the timer shaft and cam around which it moves, thereby advancing or retarding the timing of the engine as desired, without changing the angular relation of the distributor parts.

Lubrication of the bearing and governor parts in the compensating system is accomplished by means of a simple splash system. An oil cup in the base of the main housing permits the lubricant to be easily fed to the proper level into a sump within the shell. When the timer



Top, left—the Bosch timer - distributor, having the compensating feature for advancing and retarding the spark. Right—the contact breaker or interrupter, sets in an accessible cup. Below — the Bosch coil dismantled. Though easily taken apart, it has positive electrical connections

shaft with the governor mounted thereon starts to rotate, the governor ring dips into the oil and sprays all parts. The shaft bearings are lubricated by capillary action through a felt wick leading from the sump to the shaft. In the manual system the oil lubricates the shaft bearing according to the best engineering practice.

The interrupter is assembled in a cup which also contains a condenser. The whole unit therefore can be easily removed for inspection without disturbing any of its component parts or electrical connections.

The low tension terminal, externally connecting the primary of the coil, is carried by the cup itself.

The interrupter lever is made from a one-piece steel stamping, copper and nickel-plated. Its construction is such as to provide a very light but strong and rigid lever, and the spring tension required for its operation need be but very slight. The combination provides not only an exceedingly fast lever, but one which will cause very little wear upon the fiber block and contact point.

In addition to these features, the design is such that the lever closely follows the cam without "bouncing" or "hurdling" or other uncontrolled action. Numerous tests have shown that the interrupter action is perfect, even at speeds in excess of 5,000 r.p.m.

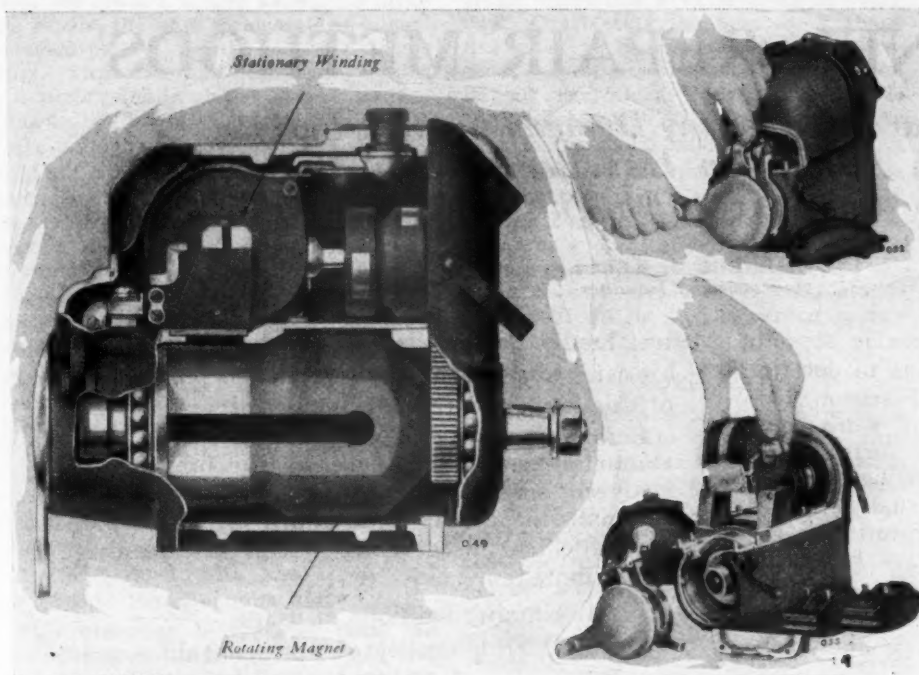
The condenser is of the dry-wound type, totally enclosed and sealed in a moisture-proof metal housing.

The distributor cap is mounted on top of the main housing, and is brought into alignment with the cam shaft by a slight projection of the interrupter cup over which it fits. A moulded-in tongue fits into a slight recess in the housing, which prevents incorrect assembly.

The towers for the high tension cables are of sufficient height to eliminate short circuits and any external creepage of the high tension current.

The carbon brush in the central tower used for conducting the high tension current from the secondary winding of the coil to the rotor insert is of the "prisoner" type. Although it is kept in absolute contact with the rotor insert by spring pressure, it can neither stick nor

Scintilla Magneto Newcomer in This Country



Sectional view of the Scintilla magneto, showing stationary winding and rotating magnet. The smaller views show ease with which contact maker and winding can be removed

escape even when the distributor is removed.

The high tension cable connections of the distributor cap are simple, and ease of attaching cables is a special feature. It is only necessary to cut the cable off flush with the stranded copper core, and push the cable into the towers of the distributor cap.

The ignition coil is of the dry-assembly type, as distinguished from coils which are sealed with insulating compounds. Its construction permits the accessibility of all parts, and simplifies assembly of the whole unit.

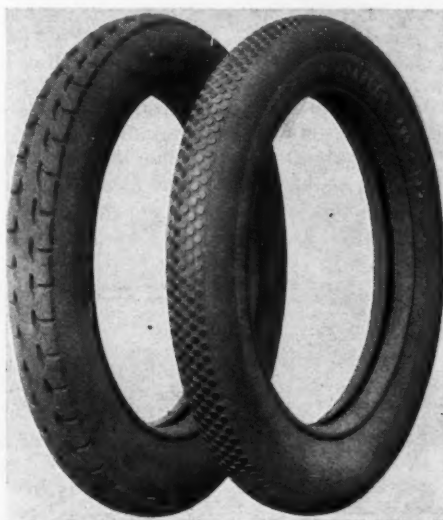
Michelin Brings Out New Tire

MICHELIN has placed on the market a cord tire with a steel studded band which appears to be the only one of its kind in existence. During the past two years there has been a remarkable change in European tire construction, practically all makers taking up the cord type, and as a consequence, steel studded treads are only used on a very limited scale. In some quarters it has been claimed that the steel studded tread was destined to total extinction.

Michelin considers that the use of the steel studded tread should be encouraged, and after long experiments has succeeded in developing a satisfactory metal non-skid with the cord construction. The tire is a development of the rubber tread cord tire known as the cable, which was brought out by

Michelin about two years ago, and has met with much success. Michelin states that this type of tire has been adopted in order to assure all the advantages of the cord construction with the practically unpuncturable features of the steel studded tread.

With a view to increasing the non-puncture qualities of the tire, the steel studs are much broader and flatter than on old type steel tires. With a tire of this type here is a 90 per cent guarantee of the tire being used down to the cords without an accidental puncture by metal or loose stones. This is particularly advantageous on French roads which, while being fast, are often strewn



Steel-studded and rubber tread tires of cord construction recently introduced by Michelin

with loose stones capable of going through an all-rubber tread. The cord tire with steel-studded tread is sold about 10 per cent higher than the same type with rubber tread.

The steel studded tire is excellent as a non-skid under all conditions except dry granite sets, and it is for this reason that in the past the European practice was to use a steel-studded tread staggered on front and rear. Experiments carried out by the Michelin engineers show that when cars are fitted with four wheel brakes there is no skidding on granite sets, and it is therefore possible on such cars to use steel studs on all four wheels, thus getting non-skid qualities under all conditions, together with a big guarantee against accidental puncture and the longer mileage of the cord compared with the fabric type. There are indications that in France, at any rate, there will be next season a sufficient number of cars with four wheel brakes to make the use of steel-studded treads all-round quite a common practice.

Scintilla Magneto of Novel Design

ASIDE from operating on a different principle from other magnetos, the Scintilla magneto, a Swiss product recently introduced into this country by the Scintilla Magneto Co., New York City, possesses the advantage of accessibility. On this instrument the permanent magnet rotates, while the contact breaker, the windings and the condenser remain stationary.

The points, winding, distributor and safety gap are placed in the upper part of the magneto, where they are protected from oil and dirt. Only the magnet and contact breaker cam are exposed. The contact breaker can be taken off instantly by hand. It is held in place by a bayonet lock. The distributor carbon brush holders are demountable by hand also. There is minimum wear on the brushes, it is claimed, because they are stationary; the spring pressure is light at all speeds as there is no centrifugal force to increase the pressure. Two screws hold the winding to the pole pieces, thus permitting of rapid dismounting. The winding is placed next to the distributor, thus doing away with the collector ring, brush holders, etc.

No special terminals are necessary on the high tension connections. The cables are held in the distributor carbon brush holders by a single pointed screw. When timing the magneto to an engine it is only necessary to have the figure 1 on the distributor wheel appear in the small window. At this spot the point begins to break and the distributor segment is in contact with the carbon brush of number 1 cylinder. The timing lever arm can be placed in eight different positions by unscrewing the center screw on the inside.

The Scintilla is made in various types to meet the requirements of tractors, trucks, automobile, marine, aircraft and stationary engines of from one to eight cylinders.

What the Service Station Should Know About

BODY PANEL REPAIR METHODS

*There Is a New and Growing Demand for This Service
—Not Enough Instruction Has Been Given Maintenance Field to Enable It to Do This Work Efficiently*

By GEORGE J. MERCER
In Automotive Industries

WHILE the average life of a car is something over five years, the body begins to deteriorate materially during the second season. Many minor faults, such as dullness of paint, worn spots in trimming, doors out of alignment, etc., often begin to show up. Such defects, perhaps, are to be expected to a certain extent, and the owner is usually willing to bear the burden of such renewals or repairs as may be necessary.

Where an actual break in the metal panels occurs, however, a different situation is presented. Such breaks do occur, and in most cases the owner is likely to pro-

test loudly that he has not received fair service from his car. Consequently, the matter of repairing damage of this kind is extremely important.

Before discussing the methods of repair for steel and aluminum panels the causes of the breakage may be analyzed, since to eliminate those causes would be to eliminate the damage and the dissatisfaction. There are two chief causes to which such body breakage may be attributed:

1. Unfair conditions of usage.
2. Inferior quality of workmanship.

EXTREME weave of the chassis frame usually results from sudden stopping and starting, rapid acceleration and other similar jars to the frame. Every violent swing twists and strains the car body. It is only a matter of time until the framing will weaken at vulnerable points and cause the metal to break through continual bending.

Roadsters and coupes generally give out first around the door opening of the rear compartment, because the opening space makes for high local stress at the four corners. If these points are rigid enough to withstand the strain, the joint between the rear deck and the rear panel is likely to part. This latter point is indicated by the letter "A" on Fig. 1.

Inaccurate design or poor workmanship often show up in improper fitting of the body to the frame. Subsequent body injury is invited when the body does not fit easily and without forcing at the points at which it is bolted to the frame. If the body is pulled down to make it touch at the bolt hole, the framing will bend and the panel will break at some place near to that at which the pressure is exerted. Strains will be set up, moreover, in other places by the pulling stress on the framework.

Poor workmanship also shows up in many other ways. Sometimes, for instance, the wood is so framed that a joint will come opposite a panel joint where excessive strains will occur. Again, joints may be poorly made or the wood not well dried, so that it shrinks after being framed and draws away from the joint. The panels may be filed too thin at the welding points. This defect frequently occurs and is not readily detected until a break actually occurs.

In normal times few of these deficiencies should be present, but the results of the comparatively unskilled labor that was rushed into service during the last few years are showing up at this time.

The causes of the trouble being fully understood and the importance of such difficulties recognized, means for remedying breaks after they do occur must be devised. Methods for repairing steel and aluminum differ slightly, and both will be discussed here.

STEEL BEST FOR REPAIRING

Steel is really the better material for panels for several reasons. The most important of these may be enumerated as follows:

1. It has greater strength.
2. It is possible to join steel panels in such a way that they are as strong as any other part of the body.
3. Irregular places can be filled with solder.
4. There is less reason to file thin at joint points.
5. Repairing is more simple; welding a piece into a steel sheet does not require the fine and intricate work necessary in welding an aluminum sheet.

Although aluminum can be welded, it must be hammered and filed. Solder

cannot be used for filling up irregular places.

Assume, for instance, that the break at "A" was in a steel panel. It is probable that the break could be welded, the irregular part around the new weld filled with solder, and the underside reinforced to overcome weakness. Painting would then be the only additional operation necessary.

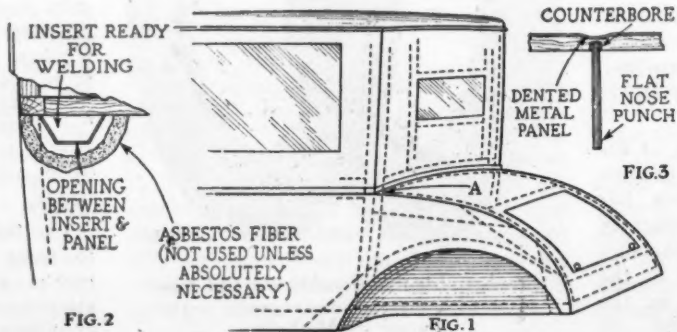
If the steel sheet is thin at the point of breaking, or if the cooling metal breaks at the same place after the first welding attempt, the material must be cut away until sound metal is reached. A piece can then be used for cooling.

The heat is kept within a small radius and protection is afforded the wood underneath by means of loose asbestos, packed tight by wetting with water. This asbestos is packed between the wood and panel and a ring of the same sheet is used around the weld. Just enough space is left to provide convenient working area for the torch. The roughness of the metal is leveled up with solder.

Suppose, however, that the same break occurs in an aluminum body. The procedure would be different. The first operation is to cut away the metal on all sides of the break and insert a piece of the size and shape suitable for the particular space.

An example of this operation is shown in Fig. 2. This piece of insert is slightly smaller than the opening, so that a space equal to the thickness of the metal sheet separates the edges of the panel from the insert on all sides. Thus the flame from the torch is allowed to pass clear through and to build up the weld from the bottom.

In Fig. 2 the break is shown



cut away and the insert in place. The space, equal to the thickness of the metal all around, is also shown. To make the repair, the part to be welded is surrounded by wet, tightly packed asbestos fiber. This fiber has been hand molded into a ring and is placed as near as possible to the work. The piece is held in place until the welder can make a catch-hold at one or two places. Then the surface of the insert and panel are leveled with a hammer. The welding operation is then continued until the work is completed.

The welding outfit for repair work consists of the oxygen-acetylene tanks, a moderate small size nozzle and a strip of aluminum sheet about one-half inch wide, cut from a panel of the same thickness and character as the sheet forming the panel and the insert. This strip of aluminum is used in the same manner as solder. No acid is used, but the parts are cleaned with a file or emery cloth. The end of the soldering strip is warmed with the torch and dipped into the aluminum flux.

This operation is repeated until the flux adheres to the end of the strip. The work of welding is rapidly performed by melting the fluxed end of the aluminum strip with the torch until the space between the insert and the panel is bridged and the two become one. A good welder working quickly will not add much thickness at the weld nor allow the heat to be stationary long enough to distort the metal surface. These defects will be noticeable to some extent, of course, but if it is possible to use a hammer, most roughness can be leveled up and the file will do the rest.

Solder cannot be used to fill the uneven places as with steel. All leveling must be done by the file and hammer. Therefore, the aluminum welding operation must be done very carefully, since only a limited amount of filling can be done; in fact, the original break is often due to filing the sheet too thin in an attempt to level the panel. In this way the strength is greatly decreased and the least strain causes a rupture.

DIFFICULT REPAIRS

When the weld has to be made over part of the wood framing, there is no chance to get at the under side to bring up dents or depressions. In such cases the leveling can be accomplished by inserting a thin strip of steel between the wood and the metal. By rubbing with this thin strip, the low points and depressions will be forced up.

Another method is shown in Fig. 3. Here a part of the panel is dented down over the framing. The illustration shows a counterbore from the under side of the wood. This should go about half way through; then, with a flat-end punch, the wood forming the bottom of the hole can be forced up. The wood will then rise over quite a large area and raise the panel evenly for quite a distance around the hole.

The welding operation described above is not novel, nor has it any features

that will attract the attention of the man who is working in some of the large shops where this work is going on every day. Considering the number of shops interested in bodies, knowledge in respect to properly repairing panel breaks is not very large. Even some well-equipped repairshops are not sure of the best methods of making repairs on a broken aluminum panel. Merely to be able to know that it can be successfully done is a matter of no small importance. It can be successfully carried out by the ordinary good workman who has had experience with welding. A good aluminum weld will be just as strong as any other part of the sheet.

REINFORCEMENT

Every repairshop is equipped with a welding outfit. The flux, of which there are several makes on the market, is easily obtained, and with a little patience at the start this work can be done on any part of the body with confidence that the result will be satisfactory.

When a break occurs it is necessary to make sure that there are not inherent weaknesses or unnecessary strains in the frame that will cause the metal to break again at the same place. The very fact that a break has occurred should indicate the necessity of making doubly sure by adding some reinforcement in the shape of a plate or corner iron. If, however, the break has occurred because the original panel was filed too thin, then the matter of reinforcement need not be considered.

Strains concentrate on the body at certain points, such as the bottom of the doorway, the corners of the opening on the rear compartment on roadsters and coupes or the small doors into the rear compartment on the side of roadster

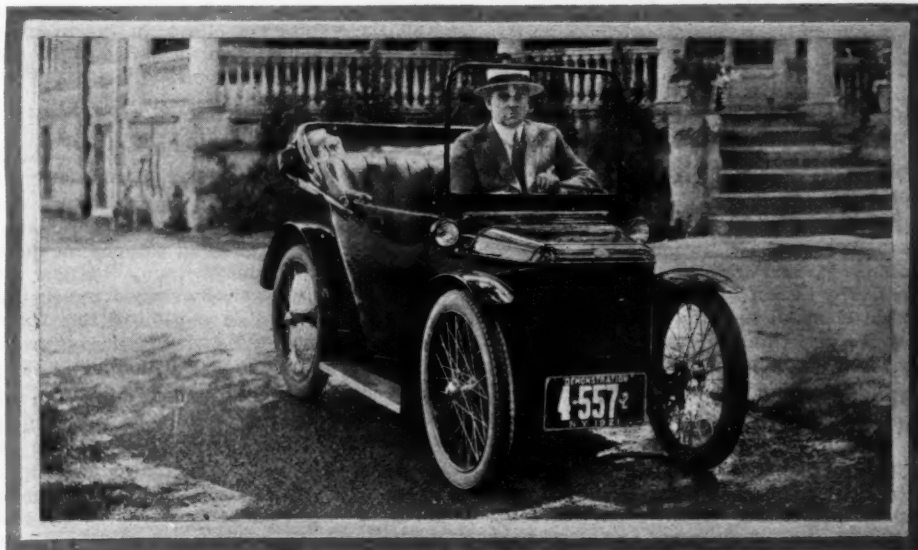
bodies. Whenever possible, a vee should be cut across to allow the panel to weave slightly without crumpling. A vee is the safest where moldings butt and there is thickness to each piece; in fact, a vee should always be used if the length and location will not make it look unsightly.

CAUTIONS

One bit of caution should be given about the use of asbestos fiber on the panels when welding. In theory this is the ideal way to curtail the space within which the heat will operate and thus protect the general surface of the panel. But it has to be used with caution, because, when applied, more heat has to be used at the weld than if no asbestos were used. Therefore, there will be a tendency to use so much heat at the welded spot that the metal becomes fluid and consequently quite a large spot may fall away entirely.

This has been discovered in shop practice also with regard to the use of cast iron forms. When welding was first practised on aluminum sheets, cast iron forms were used to draw the heat away from the sheet and keep it more nearly level during the work. It has been found, however, that better and quicker work can be done without any agency to assist the sheet in cooling. When the heat is drawn away, the amount of flame needed to make a weld is much greater. Consequently, the sheet often will flow before the weld is made. The asbestos will do the same as the iron form. Therefore, unless it is needed to protect the wood frame or keep the paint surface protected, it is best to dispense with the use of anything that will cool the panel.

Electric Car for Getting About Readily



For about-town use the electric car shown above, with an adequate touring radius and with features affording ease of handling in congested traffic, has been developed by the Automatic Transportation Co., of Buffalo. Fifty to sixty miles at 15 to 18 miles per hour can be traveled on a single charge



Canadian National Exhibition draws large throng

Canadian Show Draws 500,000

National Exhibition at Toronto Reaches High Point of Excellence Attained by Previous Displays

TORONTO, Sept. 3—Before the Canadian National Exhibition closes its doors a week from today 500,000 people will have seen the season's offerings in automobiles sold and manufactured in the Dominion.

Thus, in a sentence, may be told the story of the annual Canadian Motor Show, which is being conducted for upward of the twentieth time as a feature of the 43rd annual exhibition of the Dominion's industries, commerce and agriculture.

The National Exhibition, without parallel anywhere in the world, draws its attendance not only from Ontario and bordering sections of Quebec and Manitoba, but from all the nine provinces, with several thousand Americans from states across the lakes also present.

In recent years the million mark has always been passed in aggregate attendance, and half the crowd, conservative estimators say, pass through the aisles of the great Transportation Building, housing the motor show.

This year the attendance was well along toward 500,000 as the first week ended. Labor Day promises almost 250,000 more and the final days of next week, according to all indications, will pile up a total aggregate equaling and quite possibly exceeding the records of previous years.

There are motor trucks and automotive equipment in the exhibition, too, but the Transportation Building is too small to accommodate them and the tented city of the truck men and the transformed soldiers' barracks of the accessory exhibitors are drawing their crowds. But with the handicap of poor housing these exhibits will get only part of the vast throng, many thousands of whom already have viewed the passenger cars.

The exhibition motor show, opening on

the eve of the Canadian investing season, when the farmer has his crop money in his pockets, and everybody serving the farmer—and this is virtually everybody in Canada—is sharing in the golden yield of the soil, has always been a good selling show and a time for rebuilding of prospect lists worn down by the summer's canvassing. The early days indicate that this year's exposition will not be an exception.

In the truck section interest is light and the exhibitors declare their lot will not be otherwise until building accommodations are made, permitting their housing under a permanent roof, preferably with the passenger cars. Yet truck prospects are being obtained, too, and the exhibition effort, in the opinion of all the truck men, is going to be far from profitless.

CAMPAIGN TO DRAW DEALERS ATTENDANCE

The accessory men, manufacturers, manufacturers' agents and jobbers, are depending on a campaign to draw dealer attendance, to give them returns on their exhibition investment.

The accessory show, staged under the eye of the Canadian section of the Automotive Equipment Assn., has got away from the obnoxious retailing which has marked some exhibits both here and in the states and the result is a dignified and thoroughly representative display of garage equipment and motor car utilities, of considerable interest to the motoring public and of first interest to the dealer and garageman.

The automotive section of the exhibition, which might be likened to a dozen or so of American state and county fairs combined in one, offers some practical suggestions to the motor car and truck men across the border.

Several American state fairs have automotive shows, some of them better

business stimulators than the mid-winter exhibitions in the same cities, but in many sections of the States the state and county fair are overlooked as opportunities to sell the motor transportation idea—"passenger and freight"—and at the same time sell cars and trucks.

It is not necessary to dwell on the sales possibilities of a collective showing of the Dominion's automotive merchandise before 500,000 or more people, nor on the education of the public in motor car and truck utility by means of such an exposition.

There are something like 9,000,000 people in the nine provinces and one in every 18, at least, sees the motor show. It is difficult to believe that many of the stay-at-homes can miss hearing the story or reading it in the newspapers. Strangely enough, the motor vehicle population of the Dominion—estimated at approximately 500,000 at mid-year—also stands at a 1-to-18 ratio with the population, and the automotive men give a liberal share of the credit for this progress to the influence of the National Exhibition.

What might be done with the motor-show-at-the-fair idea of the Canadians and of several American states in many sections of the United States where really big fairs are held, the automotive men of those sections know best.

This great exhibition, an institution in Canada, whose permanency is attested by the investment this year of \$2,000,000 in a livestock arena still under construction, was born in the pioneer days of the Dominion. Year by year it has visualized the Dominion's progress. It is more than a national fair.

In all this the automotive industry, recognized as the first manufacturing enterprise of the Dominion, has a prominent place. The Transportation Building is one of the largest on the

grounds and for next year the automotive men have assurance that at least a permanent building will be devoted to trucks and automotive equipment, with a larger Transportation Building, housing all the products of the industry, as a hope of the future.

As for the automotive men of the Dominion and particularly of Toronto, where most of the Canadian and American manufacturers have their principal offices and main distributorships—they are confidently counting on the show to stimulate business. It has been, they say, "Not too bad." The business readjustment has been in progress about a year, having started a little later and not being quite so far advanced as across the border. Cars had a fairly good May and June, in a few cases a good July, though except in one or two instances there has been no such stimulation as a result of price reductions as prevailed in quite a good many lines in the States.

August generally has been a poor month. Now come reports of normally good crops in the prairie provinces—Manitoba, Saskatchewan and Alberta—and while some of the proceeds, as in the American middle west, will go to satisfy notes held by the banks, there will be some left for essential purchases.

This is expected to mean direct buying of cars and accessories and some trucks, in the grain belt, and a stimulation of Canadian industry, which manufactures largely for Canada, and of commerce in the south and east, also releasing automotive purchase money. The cattlemen are hard hit by abnormally low prices but there is relief for this situation in the decision of the Dominion Government, which is quickly responsive to agrarian needs, to carry the cattle raisers along on Federal loans.

The show has served to introduce the

new Durant four of American manufacture and the new McLaughlin four, built at Oshawa by the MacLaughlin (Canadian equivalent for Buick) division of General Motors of Canada, Ltd. The Reo has its 1922 series car on display and Willys-Overland of Canada, Ltd., is showing a special model, with composite body, of the Overland four. The Paige Daytona model roadster is having its first Canadian showing. Vauxhall and Austin represent England in the show, and Fiat, car and truck, are shown by representatives of the Italian manufacturers. Rolls-Royce, which has arranged Canadian representation, was unable to get a car to Toronto before the exhibition opened.

A good many Canadians think their cars come high, but they are buying them just the same and they will buy them in increasing quantities as the provinces grow and as the factor of sales resistance in poor roads is overcome.

One Service Manager Advises Against Too Large a Parts Stock

WHAT is needed by service managers all over the country is a greater sense of their responsibility to their particular companies and also to the automobile industry as a whole.

This is the belief of W. W. Winder, local service manager in Indianapolis for the Cole Automobile Co. He says that when service managers as a unit get this spirit, they will begin making a more thorough study of their jobs.

The service manager's duties he defined as follows: "A service manager is in his place to render service. The title was correctly named. He renders service primarily to the person who owns a machine and in doing so he renders service to his employer.

MAKE STUDY OF DEMAND FOR PARTS

"One of the great problems that confront the service manager is the question of stock. He should make such a study of his demands for parts that he will be able to gage from month to month very accurately just what stock he should have on hand in order to render the maximum service on the minimum capital outlay. I am fortunately located, being in the same city that the machine is manufactured, but if I were far distant and had to order days in advance, this is the method I would follow in establishing the business on a firmer basis.

"I would keep a complete stock the first year, such that I would be able to meet any demands for parts. During this year I would keep accurate check on the quantity and parts used, checking by months, for certain parts are not broken as much in January when the weather is unsuited to motoring, as



W. W. Winder, local service manager for the Cole Motor Car Company at Indianapolis

in July, when everybody is on the road. I would know exactly how many machines of my company were in my territory. By checking on the number of parts required each month and knowing the number of machines in my territory, I would be able to strike a fair average on the number of parts of different sorts required per machine. The check the first year would show some results, but after a five-year period it would constitute an accurate stock guide. If two or three new machines were sold each year in my territory, only a stock number of parts required for each machine need be added each month.

CAPITAL TIED UP USELESSLY

"I have known service managers who carried complete stocks—in fact, too complete. They had a lot of parts they would not use in a hundred years and the capital was tied up uselessly. By comparing the number of fenders, king pins, bushings, wheel bearings, transmission parts used with that of other parts the relative demand may be ascertained.

"A little practice that I employ in my service station is the following: I meet every owner who comes into the department, thereby letting him know that I am interested in him. I find out just what he needs before I leave him. He may think he needs something he does not need at all. His knowledge of mechanics is limited, and perhaps an acquaintance may have told him that a particular motor slap meant that he needed something entirely different from what he really needs. When he comes to the station, he may call for the part this friend has told him he needs. If that were as far as the trouble were investigated, he more than likely would be cussing the department in a week for not knowing its business.

OWNER HAS NOT DIAGNOSED CASE PROPERLY

"When an owner comes into my department I let him tell all about what he needs, for he has to get it out of his system, and then I ask him what the symptoms are as manifested in the performance of the car. If it is a complicated case, we try out the motor together. More times than not, in motor or rear system difficulties, the owner has not diagnosed the case properly and if we were to take his word for what was needed we would shortly be in trouble.

"Not only do I meet owners when the car is brought in, but I always see them when the repairs are completed. By doing this, the owner is made to unconsciously feel that the service manager is taking a personal interest in him, and this pleases him. He feels that a better job has been done because of this interest on the part of the service manager."



EDITORIAL



The Used Car Market

ONE of the favorite topics of discussion when automotive dealers meet is the used car situation. Especially are dealers anxious to discover a remedy for the present unsatisfactory basis of operation. Time and again, pooling has been tried. It has succeeded some places because the proper individual was handling it. Often when this individual attracted so much attention to himself that he got a better job, his plan quickly went into the discard under his successor.

The chief trouble with the used car market is that owners are frequently better salesman than the new car salesman is a buyer. This is a situation that is difficult to remedy and the end is not even in sight.

There is another source of much trouble. Within the last few days many dealers have heard that one prominent car maker has refused to adjust prices further on the car, but has granted dealers an additional leeway in the allowance for old cars.

This may or may not be true in this case, but it was true in a number of cases several months ago and is true today on some truck sales. Wherever a dealer seeks to take advantage of this offer, he is going to rile the waters of the used car market to the very bottom. After he has handed out a few of these offers, the waters will be so muddy that no dealer can see the bottom.



The Same Old Story—Inaccessible

SOMEONE has said that when car designers and builders carry out their plans they do so without ever considering the ultimate consumer—the car owner.

Perhaps this is a little far-fetched, but when one hears the remarks of owners and service station employees, the thought arises that there may be a great deal of truth in the statement. Probably the whole thing can be summed up in saying that many of our cars are not as accessible as they might be.

It takes too long to perform some of the more common service operations on the engines, transmissions, axles, etc., of American cars. Of course, it must not be understood that progress has not been made in the simplification of the chassis to make repairs and service work easier, because some of the later cars have been built largely around the maintenance idea.

Why do mechanics prefer working on certain makes of cars? Generally, because the various units can be more easily reached. No one likes to, nor can they do a good job of valve adjustment when a host of things like manifolds, control rods, choker wires and a half dozen other things interfere with the movement of wrenches. Take the end tappets on some L-head engines, for instance. They are tucked away so neatly in the corner of the valve chamber that they can be reached only with special wrenches, if at all.

In the case of cantilever springs on some cars—all the praise they receive for their wonderful riding qualities is nullified by the cursing done by the service man in trying to get at such a spring for lubrication, tightening clips, shackle bolts, etc.

Some engine makers seemed to have their minds imbued with the idea that such parts as the distributor, water pump, generator, etc., should be put anywhere but where they can be easily worked upon. We recall a case where the distributor is almost behind the engine, where it is difficult to observe the action of the contact breaker unless one uses a mirror to see what is going on. Also, on this same job, when the distributor cover is to be removed one must first disconnect a foot throttle rod and slide a few more wires and levers to one side.

A lot of so-called carbon in an engine is road dust, and many service operations on the engine could be made a lot easier if the car maker provided a different form of air intakes. Look over some of our engines and see what a wonderful catch-all for dust, water, bugs—or anything else—the air intake makes. On a great many engines the intake is even in a vertical position, thus allowing gravity to help fill up the engine with dirt.

The service station men have their troubles, and it seems the car designers might spend a little time profitably in the repairshops to see what problems arise. Building many cars in the factory is vastly different from working on an individual car with the equipment and mechanics which the average shop affords.



Oh, For More Pockets!

EVERY once in a while someone rewrites an old joke in a new form so that it is quite readable. This has been done in this instance with the joke about the boy's pockets. We print this latest version:

"Oh, dear!" sighed Edward, "I wish I had another pocket."

"You have several now," rejoined his mother. "Why do you want another?"

"I've looked through all of them for my knife," explained Edward, "But couldn't find it. If I had another pocket that's where it might be."

Now we want to say that this is a most excellent service station joke. How many times, as you have watched the motor mechanic at work, have you wondered at his search for tools? You knew when he stopped, after going through the last box, that he was saying, "If there were only a few more boxes around here I am sure I could find that wrench."

A move in the right direction in most shops would be to reduce the number of pockets and insist that the tools be kept where they belong, so that the mechanic can find them. It would reduce the overhead quite a bit if workers would cease looking for wrenches.

Ford Prices Lowest in History

King Rhiley's Hudson Wins Pike's Peak Climb Contest

**Time of 19:16 1/5 Is Slower Than
Mulford 1916 Record;
Mulford Second**

DENVER, Sept. 5—Nearly 7000 people from 20 states saw King Rhiley in a Hudson win the Penrose trophy and \$500 cash prize today in the main event of the Pike's Peak Annual Hill Climb, covering the 12 2/5 mile corkscrew course of steep grades in 19:16 1/5, while Ralph Mulford's Paige took the second prize of \$200 in 19:50 1/5.

The main event was for cars with over 300 cu. in. piston displacement. The second, for 174 to 300 cu. in. displacement, was won by Otto Loesche in a Lexington in 19:47 4/5, this being the second fastest time made today. Mulford was in the third rank with respect to time. The second prize in this middle event went to J. C. Williamson in an Allen, in 22:49 3/5. Loesche won first in both this event and the trophy event last year.

Event No. 1, for up to 183 cu. in. displacement, went to Glen Schultz in a Ford in 21:54 3/5, with William Bentrup, another last year's winner, taking second today in 22:19 in a Chevrolet.

The cash prizes totaled \$2,100, divided into \$500 and \$200 for first and second in each event.

Eighteen cars started and all made a good showing, with two forced out by minor breakages.

The course has 60 curves, many of them so sharp that they are a severe test for the driver's nerve and skill, and has grades ranging from 7 to 10 1/2 per cent. The start is six miles above the highway's gate at the foot of the peak and ends at an altitude of 14,109 ft.

The main body of the crowd watched the races from a sort of natural amphitheater on a giant shoulder of the mountain at mile 14 of the highway, from which eight miles of the course is visible, including the timbered section where Glen Cove Inn is located and the unique curves that form the letter "W" above the timber line. Spectators were scattered at vantage points all along the course, and the crowd was the most enthusiastic at any of the hill climbs thus far.

The keen interest in this program is indicated by the fact that visitors came to Colorado Springs from half a dozen neighboring states during the last few days, many of them by motor, especially to attend the races, and many states already were represented by tourists sojourning at Little, Lunnion or elsewhere in Colorado's scenic treasure land.

While last year's trophy event was finished in a snowstorm so severe that

Mulford abandoned the race near the end, and a heavy rain and electric storm was a long-to-be-remembered feature of the 1916 program, weather conditions today were ideal and there were no accidents.

The crowd was a third larger than last year. The program moved along rapidly and smoothly. There were no protests and the affair was a success in all respects.

The Penrose trophy, which was pictured in *MOTOR AGE* at the time of the first hill climb on this \$250,000 highway, and which is valued at \$4,000, was first won five years ago by Rea Lentz in a Romano Special, when two days were given to the three automobile events and to the motorcycle contest, not included in the later single day programs.

The time, 18:24.7, made that year by Mulford's Hudson in winning first place in the middle displacement range event, still stands as the record for the course, although there were strong expectations that a new mark would be set today when there were more cars making fast time than ever before.

The hill climb is remembered as one of the most important annual events in the entire west, from the standpoint of a spectacular racing exhibition and a rigid test for car mechanism and driving ability.

In conducting today's program the Pike's Peak Automobile Highway Co. had the cooperation of the Colorado Springs Chamber of Commerce in making it a community affair, while the sanction and supervision of the American Automobile Assn. and the extensive interest of automotive manufacturers and dealers give the event a national scope.

Third Reduction on Fords Charts Lowest Price Record

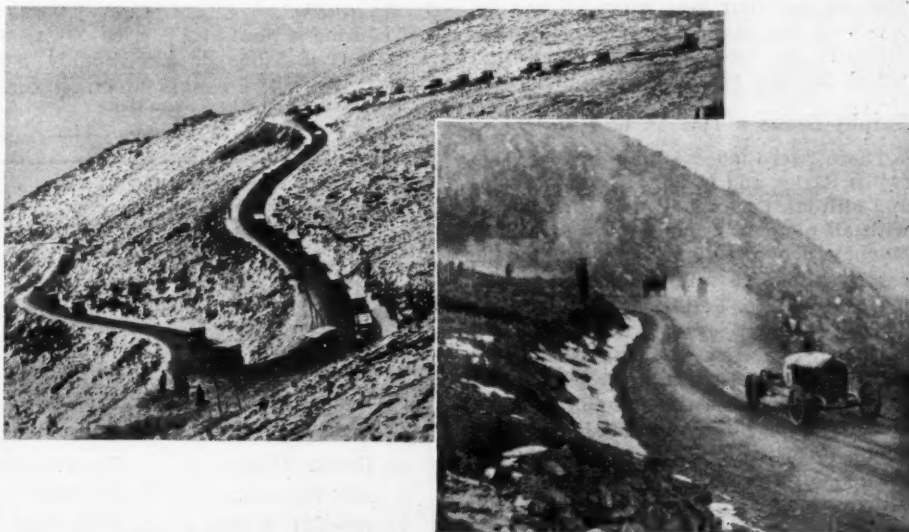
**New Quotations, Effective Sept. 2,
Range from \$50 on Chassis to
\$100 on Sedan**

DETROIT, Mich., Sept. 2—Another reduction in Ford prices, making the third price cut during the past twelve months, was announced Sept. 2 on Ford cars. The reductions amount to \$50 on the chassis, \$45 on the runabouts, \$60 on the touring car, \$50 on the truck, and \$100 on the coupe and sedan. This makes the lowest prices at which Ford cars and trucks have ever been sold. It brings the price of the touring car to \$355, chassis \$295, runabout \$325, truck \$445, coupe \$595, sedan \$660.

In this announcement Ford states: "We are taking advantage of every known economy in the manufacture of our products in order that we may give them to the public at the lowest possible price, and by doing that, we feel that we are doing the one big thing that will help this country into more prosperous times. People are interested in prices and are buying when prices are right."

"The production of Ford cars and trucks for August again broke all previous high records with the total reaching 117,969. This is the fourth consecutive month in which our output has gone over the hundred thousand mark. The total for the four months is 463,074, which has gone a long way in making possible the present reductions. June this year, with an output of 117,247, was the previous record month."

Where the Racers Roared Defiance at Pike's Peak



The winding course of the Pike's Peak hill climb with its sides staring down sheer drops of a thousand feet furnishes thrills a-plenty for the spectator and a test of skill and daring for the driver. At mile 14 nearly eight miles of the lower course can be seen and stretches of the higher four miles.

Fetterman Wins in Record Time at Uniontown, 2:15:16

Jimmy Murphy Is Second in Race Filled With Thrills; Thomas Is Bruised in Spill

UNIONTOWN, Pa., Sept. 5—I. P. ("Red") Fetterman won the 225-mile autumn classic at the Uniontown Speedway this afternoon in the fastest speed event for the distance in the history of the track. Fetterman, making only one stop, that in the first 50 laps, for a tire change, won through faster cars being forced into the pits, but participated in some of the most spectacular brushes ever seen on the speedway. Roscoe Sarles led off and set a terrific pace, averaging for the first 70 laps of the race better than 103 miles an hour.

The big thrill of the afternoon occurred on the back stretch in the 88th lap. Joe Thomas skidded, spun around half a dozen times and brought up right-side up against the lower guard rail. "Howdy" Wilcox, riding almost on his tail, hit the spinning car and did a little spinning himself. Thomas suffered bruises on his left leg. The cars were taken from the track. Thomas and Wilcox gave them the once over, whipped them into shape in almost a twinkling and were back into the race amid the cheers of the crowd as they again drove onto the track and started.

Hearne developed trouble with his Disteel-Duesenberg and got out of the car in his 121st lap. Milton, who had been forced out of the race with his four-cylinder Frontenac, jumped into Hearne's seat, made a lap or two and then was back into the pits. The trouble was remedied and Milton was a "driving fool" for the rest of the race, eating up space terrifically, but unable to overcome the lead of the other cars. Bennett Hill, in his Frontenac, had more trouble in the ninth lap and was in the pits. On his 19th lap he came in and stayed in. Thomas lost four laps when he was delayed in the pits when mechanics had difficulty in loosening the right rear wheel for tire change.

Murphy Drove a Terrific Race

There were spectacular brushes between Sarles and Milton; Hearne, Sarles and Milton; Fetterman and Murphy, and with all of them grouped neck and neck, Murphy drove a terrific race with the car in which he won the French grand prix, and, like Fetterman, finished on rapidly ebbing tires.

Murphy was near disqualification in the latter stages, when, after sensational driving on a blown tire, he slid past his pits. Backing up, his mechanics were about to swing on a new tire when a cry of warning from the judges' stands called attention to the rules, and he was off for the run around the course again to stop at his pits. He made the tire change in 26 seconds. It was then that Fetterman won the lead which, although

cutting down distance with tremendous strides, Murphy was unable to overcome and Fetterman was returned the winner.

Fetterman turned three laps after the checkered flag was signalled and when again called into the pits said he thought he was in second place and Murphy was first. He did not know until congratulations were being showered upon him that he was the victor in his first big professional race. The track was exceedingly fast and, despite the heavy rain during the night, exceedingly hot. There was an unusually large number of tire changes which furnished many thrills.

The speedway divided a purse of \$22,500, the winner taking \$7,500. The crowd was 25,000. There were 10 starters.

Jules Ellingboe had motor difficulties in the early stages of the race and, slowed down, was unable to make the showing he had expected. He figured last June, in his first race at Uniontown, in the most spectacular non-fatal accident in the history of the speedway.

Thomas, Wilcox and Ellingboe were flagged in by the officials without completing the full 200 laps, but participate in the money, there being nine prizes. Eight cars finished in the money. The race was also a championship point event, 850 points being divided.

FRANKLIN AGAIN REDUCES PRICE

Syracuse, N. Y., Sept. 1—The H. H. Franklin Mfg. Co. has made the following price reduction, effective Sept. 1:

	Old	New
Sedan	\$3,650	\$3,350
Touring	2,650	2,350
Broughan	3,550	3,250
Roadster	2,550	2,300

OVERLAND IN THIRD REDUCTION

Toledo, Sept. 6—For the third time within a year the Willys-Overland, Inc., has reduced prices on the Overland and Willys-Knight cars to the lowest price levels in the history of the company. The new prices compared with those of a year ago are as follows:

	Old	New
Overland touring.....	\$1,035	\$ 595
Overland sedan.....	1,675	895
Willys-Knight touring.....	2,300	1,525

These reductions range from 34 per cent on the Willys-Knight to 43 per cent on the Overland.

Indiana State Fair Races Draw Card of Speed Kings

Country's Best Drivers Will Attempt to Lower Record for a Dirt Track

INDIANAPOLIS, Sept. 6—The state fair officials have endeavored to give their patrons on Saturday, as the climax of the fair, an automobile race that will bring together a galaxy of stars. Sanction of the A. A. A. permits the entries of any of the drivers who were in the last 500-mile race.

The first to enter was Jules Ellingboe, who in his first speedway race finished third. His entry was closely followed by that of Bennie Hill, who finished ninth, and Roscoe Sarles, who finished second. In addition to these, Dave Koetzla, who has been a familiar character on the dirt track in the west for years, and L. L. Corum, who after qualifying in the Memorial Day races was unable to drive on account of ill health, have also sent in their blanks. It is almost certain that by the time entries close, Sept. 5, that Jimmy Murphy, who just arrived in this country after winning the French Grand Prix, also Eddie Hearne, Joe Thomas and one or two others of the speedway drivers will have entered.

The list of officials will be headed by Barney Oldfield, referee; Chester Ricker, A. A. A. representative; Otis Porter, chief timer, and William Brererre, Jr., judge. The event promises to be one of the big features of fair week, and the management is making preparations for the handling of a tremendous crowd. With anything like fair weather, new dirt track records should be set.

INDIANA TRUCK DROPS PRICE

Marion, Ind., Sept. 6—Reduction of \$705 on the 1½-ton and reductions of from \$115 to \$450 on all other sizes of Indiana trucks are announced by the Indiana Truck Corp. The price cut brings the 1½-ton truck to \$1,745 list. No change in specifications has been made, factory officials assert.

Winners and Time of the Uniontown Race

The results:

Driver.	Car.	Time.	M.P.H.
1—I. P. Fetterman.....	Duesenberg	2:15:16	99.8
2—Jimmy Murphy.....	Duesenberg	2:17:06:75	98.5
3—Roscoe Sarles.....	Duesenberg	2:17:46:44	98.
4—Eddie Miller.....	Duesenberg	2:23:46:48	94.
5—Hearne-Milton	Disteel-Duesenberg	2:41:44:22	83.8
6—Joe Thomas.....	Duesenberg	2:50:19:04	.....
7—Howard Wilcox.....	Frontenac	2:50:23:04	.....
8—Jules Ellingboe.....	Frontenac	2:59:49:78	.....

Prosecutor Asks Inquiry in Revere Motors Tangle

**Claims That Exorbitant Profits Were
Made by Directors and Alleges
False Statement**

LOGANSPOUT, Sept. 6—Grand jury inquiry into the history and operations of the Revere Motor Corp., and alleged stock manipulations in Illinois by Newton Van Zandt, former president of the Revere company, is asked by Prosecutor Don Douglass in a statement made to Judge Souders. It is expected that the grand jury will be called this week when circuit court resumes. Douglass, it is believed, will ask for inquiry into alleged exorbitant profits said to have been collected by directors of the Logansport Industrial Assn., some of whom also were directors of the Revere company. It also is reported that an effort will be made to fix the responsibility for a circular that asserted the company's financial condition was sound, which was circulated even after the affairs of the company were so involved that a receivership was inevitable.

Another allegation is that when stock sale was started in Illinois, that stock valued at \$350,000 was deposited with the secretary of state as provided under Illinois "blue sky" laws and that this stock was re-issued to Van Zandt, who disposed of it before the time limit provided by the Illinois law.

Extradition proceedings are now under way for the return of Van Zandt from Philadelphia to Logansport for trial on a charge of grand larceny, filed by J. B. Porter, Buffalo.

Receiver Asks \$7,500,000 Damages From Revere Co.

Indianapolis, Sept. 6—The Citizens Loan & Trust Co., Logansport, Ind., as receiver for the Revere Motor Car Corp., has filed a cross complaint asking \$7,500,000 damages against the Revere Motor Sales Co., Inc. In the original complaint the sales company asked \$500,000 damages for alleged failure of the car corporation to live up to its contract, by which it was to supply 3,000 cars a year for five years, representing \$500,000, the original complaint asserts. The cross complaint names Newton Van Zandt, former president of the car corporation, and Luther M. Rankin, Francis Reilly and George Walters, stockholders in the sales corporation.

CREDIT CONVENTION COMMITTEES

New York, Sept. 5—Committees for the "Back to Normal" Credit Convention of the Motor and Accessory Mfgs. Assn. have been announced by General Manager M. L. Heminway. The Detroit committee of arrangements will consist of C. W. Dickerson (chairman), vice president, the Timken Detroit Axle Co.; E. R. Alles, treasurer, Detroit Steel Products Co.; M. A. Moynihan, secre-

tary, Gemmer Mfg. Co.; William Hendrie, secretary, Detroit Gear & Machine Co.; Thomas M. Simpson, credit manager, Continental Motors Corp.

The honorary committee, consisting of the association's board of directors in Detroit, has also been appointed. These will comprise: A. W. Copland (chairman), president, Detroit Gear & Machine Co.; C. H. L. Flintermann, vice president, Detroit Pressed Steel Co.; E. P. Hammond, president, Gemmer Mfg. Co.; F. Glover, vice president, Timken-Detroit Axle Co.; G. W. Yeoman, vice president, Continental Motors Corp.

FRESNO RACE 150 MILES

Fresno, Cal., Sept. 5—Twelve drivers have entered for the San Joaquin Valley race of 150 miles, which will be run here Oct. 1 over the Fresno speedway in connection with the annual Fresno district fair. Decision to change the race program from a series of 25 and 50-mile sprints to one long race was made at the request of a majority of the drivers, according to H. E. Patterson, manager of the speedway. Among the drivers who have signed for the race are Tommy Milton, Joe Thomas, Roscoe Sarles, Joe Thiele, Tom Alley, Frank Elliott and Bennett Hill. Patterson announces that Jimmy Murphy and Ralph de Palma were signed immediately following the Grand Prix at Le Mans.

SPOKANE SALES PICK UP

Spokane, Sept. 5—With improved business conditions, and credit allowances gradually speeding up sales of new cars, Spokane automobile dealers are finding that the used car situation is assuming a brighter aspect.

Sales of used cars are dependent upon new car sales, according to E. Stock, managing secretary of the Spokane Automobile Chamber of Commerce. Seventy-five per cent of new car sales entail used car transactions, according to Stock.

SEGER SUCCEEDS COLT

New York, Sept. 6—Charles B. Seger, president of the United States Rubber Co., has been elected chairman of the board to succeed the late Col. S. P. Colt. Seger remains as president also. Lester Leland continues as vice chairman of the board.

ROAMER LOWERS PRICE

Kalamazoo, Sept. 6—The Barley Motor Car Co. of this city has reduced the price of Roamer cars as follows:

Model 6-54-E	Old	New
4-pass. touring	\$2,985	\$2,485
4-pass. sport	3,150	2,650
7-pass. touring	3,250	2,750
5-pass. sedan	4,450	3,950
Cabriolet	4,150	3,650
Coupe	4,250	3,850
Town car	4,650	4,000
Model 4-75-E		
4-pass. touring	4,250	3,600
Sport	4,375	3,785
4-pass. roadster	4,375	3,850
2-pass. speedster	4,500	3,985

Federal Reserve Board Is Hopeful of Motor Industry

**Movement of Crops Will Aid in
Liquidation of Indebtedness
and Establish Credit**

WASHINGTON, Sept. 7—Analysis of reports received from agents of the Federal Reserve Board on business conditions throughout the country show that the automobile trade is feeling its way out of the past economic depression. The price reductions have stimulated sales and the early marketing of crops puts the farmer on the prospect list because of his improved financial status. The movement of crops away from farms is expected to have a salutary effect in the liquidation of outstanding indebtedness and provide a favorable credit situation.

The board has found evidence of improvement in some branches of foreign trade and with a fairly good agricultural yield and enlargement of manufacturing demand, it is believed the autumn season will be encouraging to trade. The federal agents state, however, that the situation is not such as to forecast any extensive or immediate revival of business in a large sense.

Because of the fact that manufacturers and dealers alike are interested in the question of price stabilization, it is significant to note the opinion of the Federal Reserve Board: "Price movements have been on the whole limited, but with a slight upward tendency in the case of some groups. The Federal Reserve Board index prepared for international comparisons shows an increase of two points to 141. The index number of the Bureau of Labor Statistics for July was 148, the same as during June. The current price reports for the early part of August indicate, if anything, a strengthening of prices in some lines.

"On the whole, it is impossible to forecast the general trend of prices during the month. Manufactured goods have probably held relatively firm, but as has been indicated above, many important raw materials have declined. Prices in general during the past three or four months have become somewhat more stabilized than they were in the early spring, but whether this period of relative stability will continue, whether prices will rise appreciably, or fall, is a matter for speculation. A continuation of relative stability in the price level as a whole might be marked by more or less extreme variations in the prices of individual commodities if the variations cancelled one another. For instance, increases which might occur in the prices of commodities which have been 'liquidated' or reduced to approximately pre-war levels might be accompanied by reductions in the prices of commodities which are still far above the pre-war level."

St. Paul Dealers in Drive for Association Members

100 Boosters Raid City in Effort to Raise New Organization to Representative Body

ST. PAUL, Sept. 3—The St. Paul Automobile Dealers' Assn. opened an extensive expansion campaign, Aug. 22, with P. F. Drury, assistant general manager of the National Automobile Ass'n, as speaker at a banquet attended by 250 automotive men. The automobile dealers of St. Paul have invited all branches of the trade to join with them in membership in a new association to be known as the St. Paul Automotive Trade Assn.

On the morning of the membership drive, 100 St. Paul men received telegrams reminding them of the day they promised their services to solicit memberships for the new association, at which time they started out to cover the entire city in the anticipation of building up membership in the new association to 300 or 400 members, divided into various craft divisions.

As a result of Drury's visit the St. Paul dealers expressed their desire to affiliate and cooperate with the N. A. D. A. in every activity possible.

The St. Paul meeting completed a tour of the west and northwest made by Drury, which included a general survey of the work of the Intermountain association, the Oregon association, the Washington association and Idaho association, with meetings at Salt Lake, Boise, Portland, Tacoma, Spokane and a state convention of the Washington Automobile Chamber of Commerce at Seattle.

The trip was originally planned for the primary purpose of assisting the Washington Automobile Chamber of Commerce and bringing about the amalgamation of the Washington Automotive Trades Assn., which has recently been organized, with that of the chamber.

Drury reports that in all of the large

cities visited the retail sales for the month of July were considered better, but at the same time there seemed to be an additional amount of used cars piling up in the hands of the dealers. Country business seemed to be demoralized, due to the inactivity of the various industries in the cities visited. While it was reported that many dealers in the tourist sections were using their demonstrators for taxi service, at the same time it was found that those dealers who were maintaining a strict business program were selling more cars than in some previous months, and as a whole they expressed a spirit of optimism for the future, although there was a general attitude that the average sub-dealer will have hard picking until industry opens up.

Six Fordson Dealers Unite Sales Forces in Portland

Portland, Ore., Sept. 6—The Fordson tractor business throughout this district has grown to such an extent that separate quarters have been secured for this branch of the combined business of the six authorized Ford dealers of Portland, who recently amalgamated their Fordson business under one management, with W. J. Bell at the head. For some time headquarters were maintained with the Universal Car Exchange, the joint second-hand organization of the six dealers, but with the rapid growth of the tractor business separate quarters were found necessary. Under the new arrangement the Fordson organization will have a force of seven men on the road and a staff of five service men for the Portland section. In addition to the tractor business the company handles all of the 50 or more official devices for Fordsons, including farming and logging attachments.

Columbus, O., city officials are taking steps to amend the city ordinance on maximum weights of vehicles and loads to correspond with the new state law. At present there is a variance between the two laws.

Motor vehicle registration in California for the first half of the fiscal year included 571,712 automobiles, 15,752 motorcycles and 32,216 trucks.

Plan Speedway Association of 4 Pacific Coast Tracks

Proposed Organization to Include Courses at Los Angeles, Fresno, Cotati and Tacoma

SAN FRANCISCO, Sept. 3—Conferences which probably will result in the formation of a Pacific coast speedway association, embracing the tracks at Los Angeles, Fresno, Cotati and Tacoma are being held following the two successful meets held in the Northbay Counties Speedway at Cotati, last Sunday and the Sunday before that. The prime mover in the project is A. M. Young, secretary of the Los Angeles Speedway Assn., and a veteran in the racing business. Young was a guest of the North Bay Speedway Assn., at the opening of the Cotati Bowl, when Eddie Hearne won the 150-mile event at an average of 110 miles an hour. J. Francis O'Connor, president of the North Bay association, also had as his guest, H. E. Patterson, manager of the Fresno speedway, and the three race-meet managers talked over the question of an association to cover all the speedways on the coast.

Nothing official has been given out as yet, but it is understood that correspondence with the Tacoma speedway people has been entered into and that in all probability such a coast association will be organized soon.

PACKARD TAKES VACATION

Detroit, Sept. 6—Packard Motor Car Co., in compliance with a manufacturing plan formed early in the season, has closed for a two weeks' period to give its employees a two weeks' vacation. The factory will reopen on Sept. 10 on its regular manufacturing schedule.

Employees who have been with the company 10 years are receiving full pay for the vacation period, those five years with the company are receiving half pay. Between 500 and 600 men will be kept at work to turn out rush orders.

Everybody Was Happy at the Annual Clam Bake of the



Over 100 attended the annual clam bake of the Automobile Service Assn. of New York, which was held on Long Island Sound on Aug. 21. This is the second outing held by the organization and marks another great step forward in the closer contact of the men in the service business in New York. Beside the joys of

Cleveland Business Shows Increase Since August 15

Indications Are That Sales Will Hold Up During September and October

CLEVELAND, Sept. 3.—Cleveland automobile manufacturers have experienced an increased demand for their products since August 15. This coupled with business already on hand for the month assures a healthy condition of production for September. October is looked forward to with optimism by the average automobile maker here.

Condition Considered Especially Good

The average manufacturer experienced a slight decrease in demand during the latter half of July. This slow-down continued through the first two weeks of August, but things have picked up considerably. The condition is considered especially good in view of the fact that August is a vacation month when the family stocks up for the outing, and car buying ordinarily slows down greatly.

At the plant of the Jordan Motor Co. dealers reported sales of 150 new cars per week the first two weeks of July, that is, at the rate of 600 cars a month. In the last two weeks of July sales dropped to 125 cars a week. In the third week of August sales were 135 cars. During this period the dealers were selling approximately 75 to 100 used cars a week. This is a barometer that correctly records what is taking place in this city.

Has Experienced Trade Increase

Edward S. Jordan, president of the company, predicted good business during September and October—business that will exceed the volume for August.

At the plant of the Stearns Co., G. W. Booker, sales manager, said his concern had experienced a trade increase since August 15. The factory is running at 90 per cent of normal. The company has booked many orders for the new five-passenger, two-door brougham coupe

that is to be put on the market Sept. 1.

Another barometer of conditions is the report of the McGraw Tire & Rubber Co. for July. Net earnings for the month totaled \$35,000, compared to \$20,000 in June. The company is making 2000 tires a day and 300 tubes. It was said sales are running 4000 tires daily. On this schedule the inventory is being reduced rapidly. On Nov. 30, 1919, the inventory was \$3,700,000. A year later it was \$2,200,000 and now it is down to \$1,200,000.

TO HOLD USED CAR SHOW

Oakland, Calif., Sept. 3.—The used-car dealers of the East Bay district, which includes the cities of Alameda, Oakland, Emeryville and Berkeley, will put on a used-car show in Idora Park, this city, Sept. 10 to 18. L. A. Johnson, chairman of the executive committee of the used-car dealers, has just called a conference on the show, at which plans for the presentation of several thousand used cars will be made.

PIERCE-ARROW ADDS FOUR MODELS

Buffalo, Sept. 3.—The Pierce-Arrow Motor Car Co. has introduced four new enclosed drive bodies for the standard Pierce-Arrow Dual valve chassis. These are in addition to the standard open and enclosed types of cars already listed. The new ones include a coupe, four-passenger, four-door sedan, seven-passenger sedan, and a seven-passenger vestibule sedan.

Several new constructional features are used in these models, among which is a new form of roof construction which does not differ any in appearance from the previous roof construction, but eliminates drumming. The roof, instead of being a sounding board to intensify noises, deadens all sounds. Special attention has been given to ventilation and the Duplex windows in the rear quarters lower close to the sill, the door windows open fully and the windshield is adjustable. A cowl ventilator forces air along the floor boards, while a new roof ventilator, cleverly concealed by the dome light, draws air from the interior.

Rural Sales Take Up Slack in Sagging City Business

Country Dealers Beginning to Realize on Market Following Disposal of Bumper Crops

TOLEDO, Sept. 3.—While the manufacturing and distribution of automobiles in this city is falling off, many dealers are reporting progress in the smaller cities and agricultural centers.

The marketing of crops and the delay of the buying boom has just struck the small towns and country dealers so that the total volume of business is holding firm, taking in a large section of the state.

The Willys-Overland Co. has been cutting down its working force considerably and is again on a three-day week schedule. Officials of the company say this slackening is seasonal and represents a natural decline from a period of production and sales which went beyond their highest expectations. However, they now have the Toledo plant so controlled that production may be increased or decreased on short notice.

Many of the subsidiary automotive plants here have been cutting down production in line with the slowing of production in larger plants.

JERSEY CITY TO HAVE SHOW

Jersey City, Sept. 3.—The Hudson County Automobile Trades Assn. will hold its second annual automobile show during the week of Nov. 14, when more than 25 makes of cars will be exhibited. Elmer E. Hallinger, president of the association, assisted by A. R. Southworth, H. V. Lehman, A. W. Elder and Duncan Stuart have charge of the show.

THREE EMPLOYEES STEAL 50 FORDS

Chicago, Sept. 4.—Three employees of the Ford assembly plant in this city, according to the police, have aided a group of automobile thieves in disposing of at least 50 Ford sedans, stolen from the Ford plant. Cars worth \$650 and more were sold in most cases for \$175 each.

Automotive Service Association of New York, Aug. 21



a great table loaded with all varieties of sea food, there were a number of interesting contests and events for various classes and a seven-inning baseball game. The automobiles carrying the party met at Columbus Circle, New York, and carrying banners and flags, created much attention on the 30-mile ride

California Association Declares War on Pirates

Fight Is to Put the "Wildcat" Co-operative Dealers Out of Business

SAN FRANCISCO, Sept. 5.—War to the hilt has been declared on the so-called "pirate dealers" by the California Automobile Trade Assn., as a result of the recent semi-annual convention held at Al Tahoe on the shore of Lake Tahoe in the Sierras. Under the name of "pirates" the state association combines automobile dealers, accessory stores and repair establishments which are doing business on a basis contrary to the best interests of the motoring public. The fight is to put these "wildcat" dealers out of business, and the campaign was launched when reports to the Tahoe meeting showed that alleged cooperative buying organizations springing up all over California are offering serious menace to the legitimate dealers.

The California Automobile Trade Assn. is one of the largest and most powerful of its kind in the country, with more than 40 branches and with a membership which includes the great majority of the legitimate dealers in the automotive industry in all parts of California. At the Tahoe meeting it was pointed out, and statistics were brought forward to substantiate the charges, that the "co-operative organizations" now springing up in various parts of the state rarely last more than a few months, during which period they collect large sums from unsuspecting motorists, and then leave them holding the well-known sack when the heads of the cooperative concern decide it is time to seek fresher pastures. The association, in its campaign to eliminate these fly-by-night dealers as well as piratical garage and repair men, says:

"The motoring public should know that the reputable tire men, accessory wholesalers and car manufacturers will

not allow their products to get into the hands of such dealers. Manufacturers who do national advertising know that to allow their products to get into the hands of unsafe dealers is fatal. This has been proved time and time again in the past, and will continue to be proved in the future. The California Automobile Trade Assn. is eliminating undesirables from the automobile business in this state and has pledged itself to continue its work along these lines."

That the work of the association is getting results is proved by the action of the Automotive Equipment Assn., a national organization of manufacturers and jobbers, which has just appropriated a large fund to organize all the states along the lines of the California Automobile Trade Assn. Eighteen other states already are so organized and are using the famous California emblem—the blue wheel and the gold radiator—as well as the California association's methods in eliminating the "bad actor" from the automotive industry.

GOREY OPENS BROOKLYN BRANCH

New York, Sept. 5.—The Gorey Automotive Parts Co., large distributor of authorized parts for engines, generators, clutches and universals has opened a Brooklyn branch. This is the forerunner of a number of branches to be opened in the near future in other cities. The accounts handled include Borg & Beck, Brown Lipe, Spicer, Hartford, Durston, Kinsler-Bennett, Mogul, Blood, G. B. & S., Rutenber, Ross, Fuller and Peters.

13,000 CARS IN NEW BRUNSWICK

St. John, N. B., Canada, Sept. 3.—That a total of not less than 13,000 motor vehicles will be licensed in New Brunswick this year and that the receipts from motor vehicle licenses will reach the \$200,000 mark before the end of May and will probably be as much as \$300,000 for the present year, were the predictions made by Hon. P. J. Veniot, minister of public works. Last year the number was approximately 11,000, and the fees amounted to \$198,000.

4000 Orphans Are Guests of Chicago Automobile Clubs

17th Annual Outing for City's Unfortunates Most Successful in Association's History

CHICAGO, Sept. 5.—Orphanages in this city were emptied of more than 4,000 children and homes for old men and women were vacated Aug. 31, when the Orphans' Automobile Day Assn. gave its seventeenth annual outing for the city's unfortunates in Lincoln Park.

The day's activities began at 9 o'clock in the morning when 500 automobiles loaned and borrowed by Chicago dealers called at the various institutions for the little ones and the old folk to take them for a ride. This ride ended in the park where arrangements had been made for a bountiful lunch and entertainment. Each child was given a rubber ball, flag and paper hat; favors for the old ladies were fans and the old men were given as many cigars as they could smoke. The Chicago band furnished the music.

The entertainment for the children consisted of everything dear to the hearts of childhood. Apparatus from the city playgrounds were furnished in sufficient quantity to keep every child busy when not looking at some one of the many shows that were in continuous action. There were pony acts, dog acts, Punch and Judy shows—nothing was left out. A corps of city nurses was in attendance to look after over-fed youngsters, and not a thing was forgotten to give the guests of the association a joyful day. Late in the day the 4500 picnickers were picked up in automobiles and returned to their institutions.

The sponsoring clubs and associations of the Orphans' Automobile Day Assn. are: Chicago Automobile Trade Assn., Chicago Motor Club, Chicago Automobile Club, Illinois Automobile Club, Chicago Garage Owners' Assn., Chicago Motor Liverymen's Assn., Medina Club and North Shore Automobile Club.

4000 Chicago Orphans Given Picnic by Automobile Associations



Lunch at all hours and continuous entertainment were given the children when they gathered in Lincoln Park for the seventeenth annual outing of Chicago's Orphans' Automobile Association

IN THE RETAIL FIELD

S. J. Robinson, Pekin, Ill., has sold his new garage to John and Charles Smith who will hereafter operate it. The Smiths are two brothers who are new to the motor vehicle business, the former coming from Chicago and the latter from Pittsburgh.

San Diego Automobile County Trade Assn. held its annual high jinks in Tia Juana, the Mexican town just across the line in Lower California, Aug. 27 and 28. The San Diego bunch played hosts to all the dealers' associations in California, including a delegation from the San Francisco association.

Glouster Supply Co., Cincinnati, has been appointed distributor of the Benzer lens, which is manufactured in New York, and which has been approved for use in Ohio.

Mission Motor Co., Los Angeles, has been appointed distributor for southern California. George Goodwin, president of the company, is a veteran coast distributor and associated with him is F. A. Petrie, who was formerly assistant general sales manager for Dort at the factory.

Grand Rapids, Mich.—Tire dealers of this city have organized an association for the promotion of trade interests, and have elected the following officers: S. C. Steinbarter, president; F. J. Comstock, vice president; G. Yonkman, secretary and treasurer. Directors elected were F. W. Brandt, A. V. Hall, C. B. Ness and C. Lambert.

Wildhook Co., Indianapolis, have taken over the distribution of Reo passenger cars and Reo speed wagons. The Fisher Automobile Co. were the distributors.

Hartford Windshield Sales Co., Spokane, has established a distributing house with J. L. Flanagan as manager. The company distributes sun visors, wind deflectors and tonneau windshields.

TO SPEED LINCOLN HIGHWAY

Sacramento, Sept. 3.—The Pioneer Trail Assn., at its annual meeting held at Phillips Station, adopted resolutions asking the Lincoln Highway Assn. to designate the American River Canyon, or Placerville route, as the Lincoln Highway from Carson City, Nev., to Sacramento. At the present time both the Placerville and Auburn routes are Lincoln Highways, but it is understood one of them is to be discarded.

The Lincoln Highway and the Pike's Peak Ocean-to-Ocean Highway consolidation from Salt Lake City to the Pacific coast will mean more rapid construction and the saving of thousands of dollars, the members of the Pioneer Trail Assn. were told. The state of Utah will complete the Sieberling cutoff at once, making a direct route from Salt Lake City to Ely, Nev.; and John Cottrell, head of the Nevada Highway Commission, has given assurance the Lincoln Highway through Nevada will be paved within three years.

Officers of the Pioneer Trail Assn. were named as follows: president, T. G. Palton, Placerville; first vice president, F. Maxwell, Carson City, Nev.; second vice president, B. C. Celio, Meyers Station, Calif.; secretary-treasurer, Worthy E. Marks, Placerville.

Bay State Starts Drastic Enforcement of Light Law

Boston, Sept. 3.—Massachusetts proposes to see to it that the new headlight law is not going to become a joke, and any motorists from other states whose lights do not comply with the Bay State statutes had better get fixed up before going into its confines. Motor Vehicle

Studebaker Corp. of America has moved its Detroit sales branch into the new headquarters at 3646 Woodward avenue.

Morris H. Anderson has assumed charge of the Detroit branch of Mack International Motor Truck Corp., succeeding W. W. Heits, transferred to the head office in New York. Anderson was formerly assistant manager of the central territorial division for Mack with headquarters in Chicago. Before that he was with Packard.

W. S. Williams, president, John Finch, vice president, and Harry Nelson, secretary, are the officers of the W. S. Williams Motor Co., which has taken over the West Side Motor Sales Co., St. Paul, and will conduct a Ford agency and service station.

R. L. Zak and F. C. Scharafin, Springfield, Ill., have formed a partnership and will distribute International trucks in the Sangamon county, Illinois, territory.

Central Implement Sales Co. has been organized at Springfield, Ill., with E. A. Rinck as president and W. H. Filler as secretary and will distribute White trucks and Cletrac tractors in the Sangamon county territory.

Elbert S. Hatcher Co., Springfield, Ill., has been changed to the "Motor Mart." The firm will distribute Commerce and Federal trucks in the central Illinois territory.

Louis L. Smith, for eleven years sales manager of the Cleveland branch of Willys-Overland, has become sales manager of the Nunn Motor Sales Co., Cleveland distributors of Handley-Knight cars.

A. H. Ekbergh, for two years traveling representative in New England and New York state for the Anderson Motor Co., Rock Hill, S. C., has taken over the distributor interests for his company in 16 counties surrounding Syracuse. His new corporation will be styled the Syracuse Anderson Motor Co.

Registrar Frank A. Goodwin has announced that from now on he is going to start a campaign to have the law enforced.

Just to emphasize that he is not joking—Goodwin suspended the licenses of four motorists who had not complied with the law. And that is only the beginning. He says that there will be a lot of others. Many owners believed that the law would not be made effective until after Labor Day, but Goodwin intends that it become established at once. Visiting motorists cannot have their licenses revoked in Massachusetts, but they may be arrested and prosecuted. Therefore they should see to it that they have

- 21 candlepower bulbs
- Some approved lenses or devices
- Properly focused bulbs
- If using gas for lighting
- 5/8 ft. burners
- Six in. mirrors
- No rusty or cracked reflectors

SEEK VAN ZANDT'S RETURN

Indianapolis, Sept. 5.—Requisition papers have been issued by Gov. McCray for the return to Logansport, from Philadelphia, of Newton Van Zandt, former president and organizer of the Revere Motor Corp., against whom charges of grand larceny are pending in Logansport, filed two weeks ago by John B. Porter, Buffalo, a stockholder of the company. Porter's affidavit says that Van Zandt obtained \$4,050 from Porter by fraudulent sale of stock. The petition for requisition papers was opposed by attorneys representing Van Zandt, a demurrer denying that Van Zandt was connected with the sale of the stock purchased by Porter.

Says Des Moines Show Is Proof of Farmers' Anger

Attendance at State Fair Exhibit Falls Off 20,000 a Day Compared With Other Years

DES MOINES, Sept. 5.—Des Moines dealers held their annual early fall show this week in connection with the Iowa State fair. The show was housed in Machinery Hall and was managed by C. G. Van Vliet, one of the managers of the winter show. It was held directly under the auspices of the fair association. Van Vliet worked for the fair association rather than for the dealers' association, but there was very close co-operation between the two organizations.

As a selling show this year's exposition was not up to the standard of its predecessors. The fair gave the last argument, if such a one was necessary, that as a class the farmer is removed from the present market. There are, of course, large numbers of farmers who still have the financial backing to buy what they need, but the greater number of them are not buying anything not necessary. Not only are they staying out of the market but they are in a bad frame of mind toward the retailer. They feel that while they have harvested crops at a big loss and were forced to put their crops on the market at a great reduction the retailer has failed to accept his losses. This reference to retailers is not directed at the motor car business.

Attendance at the fair was not up to that of previous years as a result of the depression which exists among farmers. There were no days of the fair which did not show a loss in attendance over the corresponding days of other years, and Monday and Tuesday the shortage ran up to approximately 20,000 each day.

OLDSMOBILE AGAIN LOWERS PRICE

Detroit, Sept. 5.—Olds Motor Works has made reductions ranging as high as \$255 in three Oldsmobile models, the price change, the second this year, being ascribed by officials to decreased material costs and increased labor efficiency.

New and former prices follow:

	Old Price	New Price
Model 43A, touring and roadster	\$1,345	\$1,145
Coupe	1,895	1,645
Sedan	2,100	1,845
Model 47, touring and roadster	1,725	1,625
Coupe	2,225	2,185
Sedan	*2,425	2,425
Model 46, 7-pass. and pacemaker	1,875	1,735
Sedan	2,775	2,635
1-ton truck	1,250	1,095
With cab		1,175
Express body		1,245

*Price unchanged.

Havens Heads Reorganized Locomobile Corporation

**Company Under New Management
Severs All Connection with
Hare's Motors**

BRIDGEPORT, CONN., Sept. 5—Reorganization of the Locomobile Co. was consummated at New York in August. Col. Elmer H. Havens, junior member of the firm of Hunter & Havens, this city, president of the Bridgeport Board of Education and prominent in financial, industrial, civic and fraternal circles, becomes head of the corporation and has already assumed charge of the big Main street plant. Frank R. Hickman is associated with Colonel Havens, as vice president and treasurer of the corporation.

These changes and reorganization of the corporation were perfected at a meeting of the stockholders in New York. Through them the Locomobile Co. is wholly divorced from Hares Motors, Inc., which had charge of manufacturing and selling the automobiles built at the Locomobile plant. Hickman was a former president of the Locomobile Co. of America, which was organized April 1, 1920, as the Locomobile Co. He was also treasurer of the Hares Motors, Inc.

President Havens Not Ready to Make Statement

President Havens confirmed reports of his election and the reorganization of the corporation. However, he was not ready to make a statement as to the plans for the new organization, but said that operations will be resumed at the local plant as soon as business conditions warrant. Colonel Havens and Hickman represent the creditors of the Locomobile Co. in the latest reorganization.

Rumors of a dissolution of Hares Motors, Inc., which were in circulation here a number of weeks ago, are not borne out by the change. It is pointed out that the connection of Hares Motors, Inc., with the Locomobile Co., to which the name of the local corporation was changed last year, were in the form of a contract for operation of the plant and the selling of its products. At that time the officers of Hares Motors were made officers of the Locomobile Co. Those officers have now resigned and have been succeeded by the local men, Havens and Hickman.

The contract between the Locomobile Co. and Hares Motors took effect April 1, 1920, and at the same time the Mercer Motors entered into a similar agreement. The Mercer Co. withdrew from the agreement last April. Hares Motors is a separate corporation, according to E. L. Larson, works manager of the local plant, and the reorganization and withdrawal of the Locomobile Co. does not effect it.

At the time the contract with the Hares Motors was made the Locomobile Co. of America was reorganized into the

Locomobile Co. and recapitalized. None of those interested would say whether any new capital has been put into the corporation under the latest reorganization.

E. L. Larson, who has been works manager under Hares Motors, tendered his resignation, to take effect Sept. 1, but may remain for some time in an advisory capacity.

The Locomobile Co. of America located in this city about 20 years ago, during the early days of automobile manufacture, at first making a steam propelled

Would Stop Women From Driving

QUEBEC, Can., Sept. 3—It is understood that at the next session of the legislature a petition will be received asking legislation to prohibit women from driving automobiles, on the grounds that the fair sex has not shown a sufficient degree of skill in the handling of cars.

The petition is launched by a group of professional chauffeurs, and will stand scant chance of passing, it is thought.

car. The manufacture of gasoline-propelled vehicles was soon taken up, and the Locomobile in a short time became one of the popular higher priced cars.

FRANCE RAISES BAN ON GAS

Paris, Sept. 5—State control of gasoline in France came to an end this month when the last of the army reserve stocks of gasoline were sold. From now on the importation of gasoline is free, with the exception that a certain percentage of the fuel imported must be kept in reserve for military use when required.

Outside Paris the minimum retail selling price of high-grade gas is now 9.40 frs. per can of 5 litres, being equivalent, at current exchange, to 56 cents per American gallon.

The American system of bulk storage and curb-side pump distributing stations is making great headway in France, particularly in the neighborhood of Paris. Dealers who stock gasoline in cans are obliged to cut their profit to almost vanishing point in order to compete with the pumps. The French motoring public appears to appreciate the time saved and the economy gained by use of pump filling stations compared with the old-fashioned can system. This latter method is likely to go out of use in all but remote districts within two or three years.

ENCLOSED CAR SHOW

Grand Rapids, Mich., Sept. 5—Grand Rapids automobile dealers will hold an enclosed car show during the week of Sept. 12, to develop an early interest on the part of automobile owners in the new enclosed models for the fall and winter season.

Walker on Harley-Davidson Speeds 25 Miles in 16:29

**Despite Bad Spill Wins Race at Rate
of 106 Miles an Hour;
Claims Record**

NORTHBAY SPEEDWAY, Cotati, Calif., Sept. 5—Otto Walker, piloting a Harley-Davidson motorcycle, finished first in the 25-mile open professional race in the big bowl here Aug. 28, thereby setting a new national record for the distance of 16 minutes, 29 seconds. This track is a mile and a quarter, so that there were 20 laps to the race, Walker maintaining a speed of 42 seconds to the lap, or 106 m. p. h. This record is faster than the record for the board track at Los Angeles, hitherto credited with being the fastest track in the country.

In addition to the tremendous speed Walker maintained throughout the race, he had a dangerously thrilling spill near the end of the first quarter of the 25-mile race. In the seventh lap one of Walker's tires blew out and sent his motorcycle skidding and careening down the steepest turn on the saucer. Walker clung to the machine, and both plunged into the ditch at the inside of the track, from which Walker crawled out, apparently unhurt, climbed on the motorcycle and started nibbling at the lead his rivals had made on him. Soon he was even, in a few laps he had passed them all and then hurried home a winner in the fastest time ever made over a board track in the United States.

Sunday's racing marked the close of the Northbay Fair Assn. season, and was attended by about 7,000 spectators, as compared with the 30,000 who saw Eddie Hearne win the automobile races here the week before. Four professional and three amateur motorcycle races furnished an abundance of thrills.

TRUCK OPERATORS ORGANIZE

Indianapolis, Sept. 3—Formation of a permanent conference of commercial vehicle operators of Indiana soon will be an accomplished fact, bringing together the chief executives of 17 state organizations of industrials using motor truck transport in inter-state and intra-state traffic. The memberships in the individual state organizations to be affiliated will reach into every county and practically every commercial pursuit in the state.

Tom Snyder, secretary of the Indiana Highway Transport & Terminal Assn.; L. M. Shaw of the Indiana Auto Trade Assn., and A. E. Pierson, secretary of Indiana Building Contractors, were named as the committee.

W. O. Moore, Indianapolis Wholesale Grocers Assn., W. S. Frye, Indiana Transfer & Warehousemen's Assn., were named as a committee to prepare a schedule of per capita tax which each organization holding membership shall pay.

BUSINESS NOTES

W. H. Daniel Auto Co., Gulfport, Miss., has been purchased by W. T. Moore, trustee in the bankruptcy case of the concern. The company has branches at Meridian, Laurel and Hattiesburg. The Meridian plant has been sold to J. J. Gunn of Thomasville, Ala., who will conduct an automobile business at the building in the future.

Pre-Selex Gear Shift Corp. has been organized in Illinois for the manufacture and sale of the Pre-Selex mechanical gear shift, which is designed to eliminate entirely the hand-shift lever and permit gear shifting through the clutch pedal. This shifting is accomplished without springs or electricity. The company's affairs are in the hands of Franklin A. Miller, vice president.

W. G. Stein Manufacturing Co., Freeport, Ill., has been organized and will manufacture spark plug terminals for motor vehicles. L. A. Jayne is sales manager.

American Motor Parts Co., Moline, Ill., which planned to move from that city, will remain and has leased new quarters. James Westphal is general manager. The Moline company is an auxiliary to the main plant in Indianapolis.

Clark-Turner Piston Co., Los Angeles, manufacturer of Deluxe lightweight cast iron pistons, announces that it can now furnish pistons for over 1200 automobiles, trucks, tractors, motorcycles, motorboats and aeroplanes.

L. W. Rinear, former official of the Interlocking Cord Tire Co., and under grand jury indictment in Akron for alleged violation of the Ohio Blue Sky law, has been enjoined by W. J. Ahern of the Akron common pleas court from disposing of \$250,000 worth of stock he is said to hold in a new Canadian firm, which it is charged Rinear organized to operate under patents held by him on tires previously made by the Interlocking Co. The injunction was granted upon petition of Elihu Harpham, receiver of the Interlocking Cord Tire Co.

Duplex Motor Truck Co., Lansing, is sending its experimental passenger bus on a tour of Ohio and Indiana, to demonstrate the possibilities of meeting transportation problems by bus operation. The Duplex bus has been in operation for two months in Lansing, demonstrating its adaptability for public transportation.

Ireland & Matthews Manufacturing Co., Detroit, makers of automobile parts, will increase its capital stock by \$700,000.

Motor Products Corp. directors have arranged to purchase for retirement 32,000 shares, or approximately 40 per cent of the company's capital stock outstanding, at a price not to exceed \$50 a share. Under the plan the stockholders are given the privilege of disposing of their pro-rata holdings, as of the close of business Aug. 23, 1921, and the right to exercise the option to sell any or all of their pro-rata share expiring Sept. 6, 1921.

Sheridan Motor Co., formerly General Motors Corp. plant, now owned by the Durant Power Co., is being rapidly pushed forward and it is announced by President D. A. Burke, that 800 men will be on the payroll by Jan. 1.

United States Motor Truck Co. has harnessed the power of the motion picture screen in the pull back to normalcy. Pictures displaying interesting truck features are being shown over the country in cooperation with agency owners.

BAN COOPERATIVE BUYING

San Francisco, Sept. 3—The northern division of the California Automobile Assn. held its semi-annual meeting at Al Tahoe, on the shores of Lake Tahoe in the high Sierras, Aug. 20 and 21. More than 100 delegates from all sections of the state north of the Tehachapi mountains were in attendance, and there was more enthusiasm among the delegates than noted at previous meetings. George Haberfelde, state president, and Robert W. Martland, secretary-manager, officiated. Martland's report showed the association to be in good financial condition and to be growing steadily and rapidly.

The principal discussion of the convention centered on the cooperative buying projects that are springing up continually

Raybestos Co., Bridgeport, Conn., manufacturers of automobile brake linings, Ford accessories and automotive supplies, has increased its capital stock from \$3,000,000 to \$8,000,000. The increase of capital stock was to finance purchase of the General Raybestos & Rubber Co., Charleston, S. C. This is an older concern than the local one and operates spinning mills of Raybestos fabrics. The combination, it is stated, means a strengthening of both organizations. The Charleston concern will supply the local concern with most of its material.

Dual Truck & Tractor Co. stockholders, Decatur, Ill., have filed suit in the Macon county circuit court against 19 other stockholders, asking for distribution and accounting.

Frasier Motor Co., local distributors of the Apperson, held several important meetings the last week in August, with Harris M. Hanshue, coast factory representative for the Apperson factory.

U. S. Auto Gearshift Co. of Eau Claire, Wis., manufacturer of hydraulic gearshifting devices for motor vehicles, has filed a voluntary petition in bankruptcy in the federal court at La Crosse, Wis., through Roy P. Wilcox, attorney, Eau Claire. The petition is signed by N. J. Whelan, president. Schedules admit liabilities amounting to \$278,424.45. Assets of \$749,258.42 are claimed.

William H. Rankin Co., New York, has been appointed advertising representative for the Raueh & Lang electric automobile, Chicago.

Sterns Gas Engine Lubricator Co., Columbus, O., has been incorporated with a capital of \$25,000 to manufacture a patented lubricator system for gasoline engines. The principal is to lubricate the entire cylinder by means of a vacuum spray.

General Motors Truck Co., Pontiac, is producing between 15 and 20 trucks a day and unfilled orders are larger than at any time since March. Increased business is attributed to recent price reductions.

E. A. Bowman, Inc., Detroit, distributor of motor car supplies, has moved into a new three-story building, 50 by 140 ft.

The Rubber Products Mfg. Corp. has been formed and chartered to operate the Kansas City Tire & Rubber Co., for the past two years operated under lease by the A. J. Stephens Rubber Co., which will continue to distribute output.

Martin-Parry Corp. has declared a quarterly dividend of 50 cents a share on the capital stock of the corporation, payable Sept. 1, 1921, to stockholders of record at the close of business Aug. 15, 1921. The transfer books will not be closed.

Packard Motor Car Co. has declared the regular quarterly dividend of 1 1/4 per cent on the preferred stock, payable Sept. 15 to stock of record Sept. 1.

New Orleans Motor Truck Mfg. Co., which is in receivership, was sold at public auction under a court order Thursday, Sept. 1.

Fisher Body Co., for the three months ended July 31, reported a surplus after all charges, including Federal taxes, of \$1,212,236. Allowing for dividends on the preferred stock, this was equal to \$2.30 a share on the 500,000 shares of common stock of no par value outstanding. In the corresponding period of last year the company reported a surplus of \$2,221,553, equivalent to \$4.29 a share on the same amount of stock.

ly in all parts of California. It was shown that some of the less well-known firms are offering large discounts to get business. This method was disapproved. The next semi-annual convention of the association will be held in February, in San Jose, Calif., the exact date to be fixed later.

SIDEWALK STATIONS TO GO

New Orleans, Sept. 3.—Sidewalk filling stations, which have been permitted in this city, will disappear Jan. 1, next, according to an agreement reached by representatives of the station operators and City Commissioners Maloney and Ray. A few stations will be permitted on the outskirts for another year, but most of them will be on the inside after Jan. 1.

Canadian Sales Promotion Campaign Gets Good Start

Auxiliaries at Montreal and Toronto Give Strong Support to Movement

MONTREAL, Sept. 3—The first meeting of the Montreal Auxiliary of the Automotive Equipment Assn. was held Aug. 26, at the Windsor hotel, with J. Ernest Millen, head of the firm of John Millen & Sons, Ltd., as chairman, and Ray W. Sherman, who recently resigned as executive editor of the Class Journal Co., to become merchandising director of the Automotive Equipment Assn., as the chief speaker. Other speakers who addressed the meeting included A. J. Hays, president of the Champion Spark Plug Co. of Canada, Ltd., and chairman of the Automotive Equipment Assn.; E. J. L'Esperance of the Imperial Life Insurance Co., Montreal, and N. H. Culver, general sales manager of the Metal Specialties Manufacturing Co., Chicago.

The gist of the addresses of the meeting was "Sales Promotion" and the formulating of new selling ideas which would bring into closer contact the manufacturer, wholesaler, retailer and consumer, and bring about an increase of business to the motor accessories trade. Sales representatives of all the local houses were present from all parts of the Dominion.

A similar meeting was held in Toronto Aug. 27.

REMOVES KELLY RECEIVER

Bridgeport, Conn., Aug. 28—Former Congressman Augustine Lonergan of Hartford, named receiver of the Kelly Tire & Rubber Co., of New Haven, three weeks ago, was removed by an order filed in the United States District Court yesterday in that city by Judge Edwin S. Thomas. The state receivers, through counsel, set up that the appraised value of the company is more than \$540,000 and the indebtedness less than \$200,000. They also allege that the parties who brought the involuntary petition in bankruptcy are not creditors, but four stockholders with small holdings, that the company is not insolvent, and that a receiver in bankruptcy would interfere with the adjustment of the corporation's affairs.

LOOKING FOR CANADIAN SITE

Montreal, Canada, Sept. 3—The Parker Motor Car Co., Ltd., headed by Sir Alexander Bertram, Montreal, is looking over the field for a factory site. Two plants have already been considered, but a decision has not yet been made.

One of the sites is located at Longue Pointe and the other is that of the Canadian Motor & Machine Co., Quebec City.

According to W. H. Parker, first vice-president of the company, it is proposed to build the Parker Six car and the Parker 2-ton truck.

Concerning Men You Know

Harvey G. Shafer, vice-president of Nordyke & Marmon Co., Indianapolis, was host to the Kiwanis Club recently at the company's plant. Luncheon was served and two hours were spent inspecting the plant and listening to talks on the manufacture of motor cars.

R. C. Rueschow, formerly with the Mitchell Motor Co., has resigned and is now with Reo Motor Car Co., Lansing, as sales manager.

Harry W. Anderson has been named general sales manager for the Duesenberg Automobile Motors Co., San Francisco. Anderson is known to the industry as the man who built the first motorized high-wheel buggy, in November, 1898.

J. P. Oliveau has been named chief engineer for the Mercer Motors Co., Cleveland.

J. Paul Winchell has been added to the research staff of the Duplex Truck Co., Lansing, Mich.

Roy F. Irvin has been made sales manager of the steel wheel division, newly organized by the Motor Wheel Corp. He will also continue his duties as advertising director.

Roy F. Irvin has been made sales manager of the Steel Wheel division, newly organized by the Motor Wheel Corp. He will also continue his duties as advertising director.

R. C. Durant, president and general manager of the Durant Motor Co. of California, has appointed H. D. Casey as advertising manager. Casey's duties include direction of advertising and publicity in five western states, the Orient, the Philippine Islands, the Hawaiian Islands, Australia, New Zealand and part of Mexico.

J. A. Kennard has been appointed freight transportation supervisor for the state of California by Earle C. Anthony, Inc., Packard distributor. Kennard will have general supervision of Packard truck sales in all the Anthony stores throughout the state.

Cassius F. Baker has resumed his connection with the National Motor Car & Vehicle Corp., Indianapolis, as district sales manager for Michigan, Ohio, West Virginia and western Pennsylvania. A. E. Vinton, formerly with the National, has returned to become assistant sales manager. Other additions to the National sales department are H. J. Ayers, L. A. Bell and A. H. Vayo, as district representatives.

H. B. Phipps, export manager for the Hudson-Essex Motor Car Co. for the past eight years, has been appointed sales manager by C. H. McCormack, general sales manager. Irving Segwalt has been appointed assistant sales manager in charge of car distribution, and C. V. Williams, export manager.

CANADIAN MOTORISTS TO MEET

Montreal, Sept. 3—A general meeting of all the motor clubs in the province, as members of the Quebec Provincial Motor League, is announced by President A. L. Caron to take place at the Ritz-Carlton hotel, Sept. 12. A long list of subjects will be presented by various members of the league, and after discussion will be handed over to committees to bring in final reports for the next general meeting.

The Automobile Club of Canada, through the president, J. A. Duchastel, will tender the visiting delegates a dinner in the evening, at which prominent speakers from this district and other parts of Canada will be present.

FAGEOL BUILDS NEW CAR

Sacramento, Sept. 3—A chassis for motor bus business in California and elsewhere is being built at the Fageol factory in Oakland. This chassis differs from the conventional design, in that it has eight wheels, arranged in groups of four, not unlike those of a railroad car's truck.

This arrangement, the designers claim, will permit the use of much smaller tires, 4 in. being the size contemplated,

S. H. Thompson has been put in charge of the San Francisco territory as sales manager for the Ruckstell Sales & Manufacturing Co., which makes the Perfecto two-speed axle. The company will open a San Francisco office.

Percy Owens, president and general manager of the Liberty Motor Car Co., has just completed a 2300-mile trip from Pittsburgh, Pa., to Portland, Me., and return to Detroit, covering all important business centers, in order to secure by direct contact, information respecting general business conditions and prospects for the future.

Allen F. Parkes, vice president and general manager of the Chalmers Co. of Tennessee, left that company on Sept. 1 to take charge of the sales department of the Packard-Nashville Co.

William A. Sutherland, for several years wholesale manager for Manwaring & Goodman, Philadelphia, distributors of Day-Elder trucks, and prior to that with the truck department of the Locomobile Co. of America in the Quaker City, has been appointed manager of the commercial car department by the Thornton-Fuller Automobile Co., in charge of sales of Dodge Bros.' business cars and Graham Bros.' trucks.

J. Paul Winchell has been added to the research staff of the Duplex Truck Co., Lansing, Mich.

F. J. Kingsbury has retired as president of the Bridgeport Brass Co., Bridgeport, Conn., and becomes chairman of the board of directors and treasurer of the corporation. He will be succeeded as president by Carl S. Dietz, vice president of the Norton Co., Worcester, Mass., who will also serve as general manager of the local plant.

George Sprowls, of the factory manager's staff of the Goodyear Tire & Rubber Co., Akron, has sailed on the Rotterdam for an extensive survey of economic and export trade conditions in Europe. He will spend a year investigating foreign trade conditions with reference to the tire and the automotive industries. Sprowls will be in Berlin on Sept. 23 for the first German automobile show held since the war. He will also attend the Paris automobile show in October and the English automobile exhibit at London in November. His business survey will include France, Spain, Germany, Holland, Belgium, Switzerland, Norway, Sweden and Denmark.

Chas. L. Pouncey, formerly shop instructor in the automotive division of the A. & M. College, Bryan, Tex., has accepted a similar position with the American Automotive School at Dallas, Tex.

instead of the enormous rubber tubes now used. The truck also gives a caterpillar sort of action in surmounting obstacles, it is said, and it will hit a 10-in. obstacle without noticeable jar.

The chassis has been completed and tested, and the stage body is now being fitted. It will in all probability run on the Western Motor Transportation Co.'s line between Oakland and Sacramento, for its test.

DURANT PLANS CANADA PLANT

Toronto, Sept. 3—Durant Motors of Canada, Ltd., is soon to be organized. The company will begin shortly to assemble the Durant four for Canadian distribution and eventually, according to W. C. Durant, will build here the entire car, even the electric system and tires. Durant has purchased a former munition plant at Leaside near Toronto. There 2500 men will be employed and an assembly building will be erected for use right away, and manufacturing on a considerable scale will be under way, Durant states, about March 1. Production of 100 cars a day is planned. A Toronto man whose identity is not known, will be associated with the American manufacturer.

False Rumors in Boston Work Damage to Dealers

One Agency Claims Loss of \$5000
Because of Wild Reports
of New Models

BOSTON, Sept. 5—Some Boston dealers and the manufacturers they represent, in particular, and the motor trade in general, have lost several thousand dollars in the last few weeks as a result of false rumors being circulated regarding different companies and some of their models. For about two weeks there has been a story going around Boston that there were some 50 models coming over the road from New York to be sold at a sacrifice, the only difference between them and the present models being that they were right-hand drive. The story had them as cars built for export, or cars that had been overseas and were shipped back. The rumor broke just when Marmon dealers were having their second annual demonstration week, and the result was that prospective buyers held off to get a look at the supposed bargains. Every method possible was taken to try to run the story down, for it spread to other places outside Boston and did a great deal of harm.

Dodge Brothers came in for the old rumor of army cars, and at Camp Devens, the officer in charge received something like 1000 letters asking for information about the sacrifice sale. Even a newspaper in New Hampshire, it is said, published the story. One man drove up from Boston to get one of the bargains.

Then there came the story about Henry Ford's new car. That slowed up business among the dealers here as a result of the story getting prominence in one of the newspapers. One of the Ford dealers declared that it represented a loss of \$5000 to him, and in less than an hour after he opened, the day the story broke, he got 20 telephone calls about it.

ORDINANCE CONTROLS GARAGEMEN

Fort Worth, Sept. 7—Fort Worth expects to end the traffic in stolen automobiles in her confines. An ordinance adopted this week provides that every garage must furnish the chief of police with a list and description of every automobile stored with it for more than 36 hours. The description must be so complete that the car can be easily identified. Failure to furnish such a list of cars at the expiration of the 36-hour period will result in a heavy fine and cancellation of licenses to do business as garagemen.

It is said the ordinance was passed because it was believed several garages in the city were doing a thriving business in stolen cars. If the new ordinance proves of value in locating stolen cars or breaks up the practice of thefts, it is likely to be adopted in other Texas cities.

Better Business

Money-making Ideas

*A dollar will be paid for all ideas accepted as Better Business—
Perhaps you have some.*

Making Chautauquas a Sales Aid

In many cities Chautauquas are being held during the summer months and it would be a good plan for the automobiles dealer to drive some of the more prominent entertainers at these gatherings about the city when they come to town.

The publicity agent for the Chautauqua would be sure to mention this fact in his stories of the event which appear in the local newspapers and there would also be a lot of comment on the action which would also help business. The dealer might also get some word of praise for the car from the Chautauqua entertainers, and this could be used with good effect in the dealer's advertisements.

This Moving Sign Draws the Trade

We humans have a universal weakness when it comes to movement or color. Some of the most compelling advertisements are based on these two facts. And when color is combined with motion, the attraction is all the greater.

Realizing this, a western vulcanizing shop man rigged up an old bicycle wheel over his shop and then sat back and watched the newcomers pour in. The wheel was provided on each alternate spoke with tin strips which were bent to an angle. These served as the blades of a windmill and the wheel turned freely in any wind. The tin strips were painted red, white and blue, each being striped with these colors. And since the wheel was directly over the sidewalk, practically every passerby stopped, looked and remembered. The front fork of an old bicycle was used to secure the wheel to the side of the building wall. The illustration shows the device in operation.

Mechanics Prove Sales Ability

Many mechanics are good salesmen but get little opportunity to exercise their ability during the day. Often these men are out in the country each evening and would make a few business calls if offered some inducement. One Iowa dealer pays them a commission for evening sales and furnishes them with a list of prospects. As sales were rather slow, he was having difficulty getting men to



Moving sign is attractive

stay out on straight commission, but he found his shopmen glad to get a chance to pick up a little extra money, and many of them were out for a few hours nearly every evening.

Bright Colored Car Aids in Paint Sales

W. H. Rudd, of Corydon, Ia., has a Ford roadster painted up in a novel and striking color scheme, which he keeps in front of his place of business most of the time. It has attracted much attention. When he gets inquiries he loses no time in showing his line of automobile paints and has made many sales since using the painted roadster.

Prove Car Quality By Statistics

Among all the cars you sold this year, how many have had any real trouble? If you have sold one or two cars a week all this year and only two or three cars out of this number have needed any real service from you—outside the service customarily given new cars—you have a splendid theme for a business-building advertisement. In such an ad tell just how many cars you have sold and just how few have needed service outside the usual new car service. Such an ad would be entirely different from the usual run and should help business considerably.

Making Use of Old Inner Tubes

Every garage has a number of inner tubes which are injured at one place beyond repair, but otherwise are in good condition. One Iowa dealer picked up a number of such tubes and by cutting out a section and splicing them made a smaller tube which was just the correct thing to put about the body when swimming. But little time was lost, as the work was done during odd moments and the old tubes were sold at a nice sum.

Truck Argument Against False Economy

"Today we are up against a problem of economy. The present truck owner cannot measure economy by a continued expense in the maintenance and support of a half or completely worn-out automobile truck. This is false economy and one that will bring such an owner closer to financial distress than anything else."

This is the theme of a full-page cooperative ad recently issued by 10 truck dealers of Fort Wayne, Ind. The dealers took small spaces on the page and the central space was devoted to a boost for new trucks. The page was headed, "Do Present-Day Conditions Justify the Upkeep On Old Trucks?"

Making Sales Among Tourists

In the latter part of the summer and in the fall of the year there are always a large number of northern people who contemplate making automobile trips to Florida or California for the winter months. Quite a number of them before going purchase new cars or secure used cars for the trip. This being the case, it is worth the trouble for the northern dealer to go after this business hard. And perhaps the best way of going after the business would be to run an advertisement in which the dealer would list purchasers who in former years secured cars from him for southern and western trips and who made the trips with ease in these cars. The ad should contain some testimonials from the owners and some short accounts of their trips. This sort of an ad would be sure to make some business for the dealer.

The Readers' Clearing House

Questions & Answers

CONDUCTED BY WM. H. HUNT

General Tests for Externally Regulated Electric System

Q—Publish internal wiring diagram of the Heinze-Springfield electric system used on the Regal car. The generator has the markings, 2-4 No. 10470. Explain this system as clearly as possible, as we are having a great deal of trouble with these systems and do not seem to be able to get them repaired.—O'Reilly's Garage, Draper, S. D.

See Figs. 1 and 2. This is what is known as a single wire grounded system. It will be seen that the generator is grounded in two places—in one of the brushes and in one end of the field winding. One end of the shunt winding on the regulator cutout is also grounded in order to form a path for the current which causes the device to close. It is quite possible that the armatures or the fields have become grounded, which condition would account for the generator's failing to operate.

However, the trouble may be in the regulators and it will be well to test these units out separately. To conduct the tests, disconnect the wire leading from the generator to the regulator and, with the engine turning as slowly as it is possible to throttle it, test the generator with a volt meter. Speed the engine up a trifle and see if the voltage rises with the speed. If it does, connect the generator to the regulator-cutout binding post marked "B" or "Bat" and watch the car ammeter as the engine speed is increased slightly.

These tests must be made with caution as, if the engine is speeded to high, the current output may rise to such a value that the generator windings will be burned. If neither voltage nor current readings can be obtained, the generator is at fault and should be examined for open or short circuits or grounds.

Testing the fields for open circuits or grounds is an easy matter with the aid of the 110-volt test lamp and leads. The procedure is to first remove the armature and disconnect the end of the field winding from the ground—in this case, the frame of the apparatus. Now apply the test leads, one to the generator terminal and the other to the grounding lead. The test lamp should light. Should it fail to do so, a break in the field connections or windings is indicated.

The next step is to touch the test leads to either the terminal or the grounding connection and the frame of the generator. The lamp should not light. If it does, a ground in the windings or connections is indicated. Now test from the grounded brush to the generator frame. The lamp should light. If it does not,

a break between the brush and the frame will be found. Test the other brush in the same way. The lamp should not light and if it does, it will be found that the brush pigtail is touching the metal of the frame or that the insulating bushings or washers of the brush holder are allowing a leakage.

Having determined whether or not the fields are at fault, the next step is to test the armature. The test for grounds can be made with the test leads by placing one on the commutator and the other on the iron of the core or on the shaft. The lamp should not light. Should it do so, the armature is grounded.

Testing for short or open circuits requires special apparatus. The best is what is known as a "growler." However, the milli-volt drop test, which can be performed with a couple of dry cells and a low reading volt meter is fairly reliable. The procedure was fully explained in *MOTOR AGE*, issues of Nov. 14, 1918, March 13, 1919, April 3, 1919, and July 24, 1919. If it is determined that either the field windings or the armature are at fault, the entire apparatus had best be sent to any one of several con-

cerns making a specialty of repairing and rewinding of these parts.

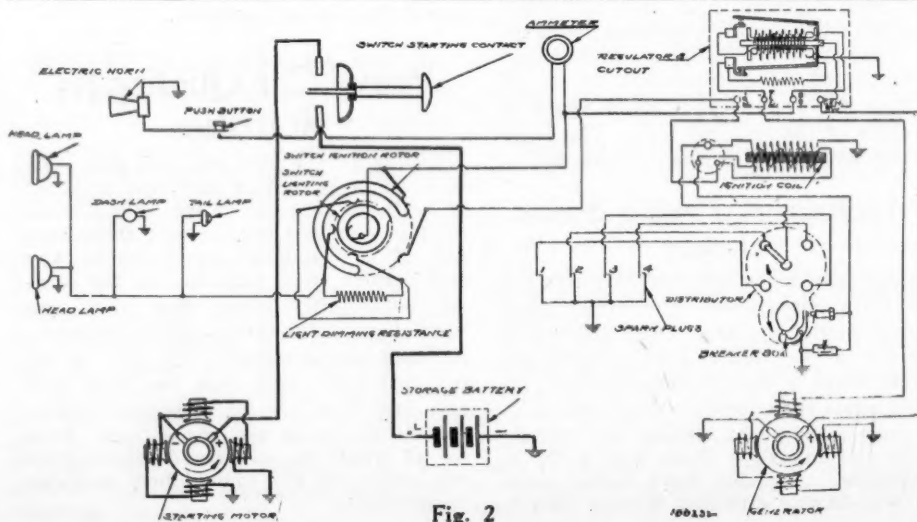
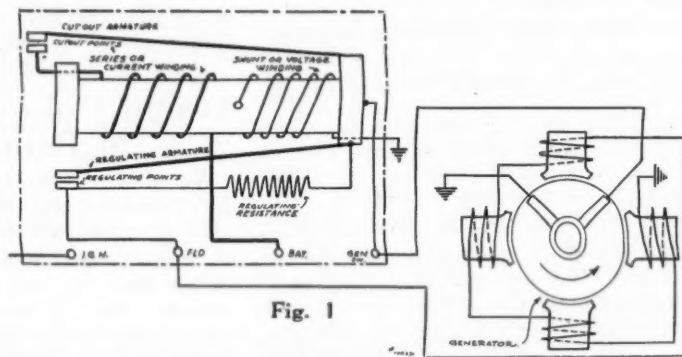
It will now be supposed that the generator tests clear and is operative. The next place to look for trouble is in the regulator cutout. This unit should be tested throughout with the 110-volt test apparatus, the object being to determine whether there are any breaks, short circuits or abnormal grounds. The term abnormal is used for the reason that there is one normal ground which must be taken into consideration. It will be seen by referring to Fig. 1 that the free end of the shunt, or voltage winding, is normally grounded.

With all external wires disconnected from the devices, test from binding post "Gen-Sw" to the free end of the shunt winding shown in the illustration. The lamp should light and, if direct current is used, the cutout points—at the top—should close and the regulating points—those at the bottom—should open. If none of these things take place, a break in the fine shunt winding is indicated.

Though the heavy series—or current—winding rarely gives trouble it will be well to test it also. First test for breaks

Fig. 1—Simplified diagram of the generator and regulator—cutout shown in Fig. 2

Fig. 2—Complete wiring diagram of the Heinze-Springfield electric system used on the Regal car



with the 110-volt test leads by placing one of them on the terminal "Gen-Sw" and the other on the terminal marked "B" or "Bat." Close the cutout contacts—those at the top—by hand. The lamp should light. Failure means that the wire from the "Gen-Sw" terminal is broken, that its connection with the iron frame of the cutout is defective, that the cutout points are dirty and making poor contact, that there is a break in the series winding or that the wire connecting it with terminal "B" or "Bat" is broken or making a poor contact.

The test lamp will not indicate a short circuit in the winding, but this may be tested with a 6-volt battery. The leads are applied to the same terminals and the cutout points closed as before. The points should be held together by the strong magnetism generated in the cutout core. If they are not and the battery current comes through, the indication is that there is a short circuit in the winding.

The only remaining point to test is the regulating mechanism. This consists of

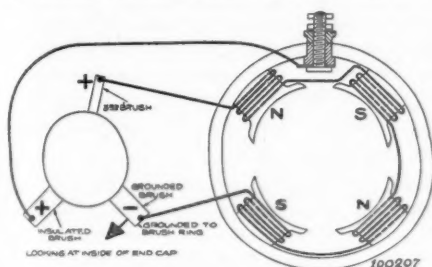


Fig. 3—Windings and connections of the third brush generator used on Ford car

the armature—the small lever at the bottom which carries the regulating points—and the resistance unit. Again recourse must be had to the 110-volt leads. Place one lead on the "Gen-Sw" terminal and the other on the terminal marked "Fld." The lamp should light to full brilliancy. Now separate the regulating points by hand. The lamp should remain lighted, although it may burn with a slightly diminished brilliancy as the current is passing through the resistance coil.

Should the lamp fail to light at all, the regulating points may be dirty or the resistance coil burned out. Testing of the leads between the generator and regulator cutout can be made with either the 110-volt current or that from the battery. When using the latter for the foregoing tests, do not maintain contact for more than five seconds, as the discharge will be quite heavy and may burn a lead or winding.

WINDINGS OF 1921 FORD GENERATOR

Q—Publish the inside wiring diagram for a 1921 Ford Generator.—E. H. Plummer, Webster, Wis.
See Fig. 3.

QUESTIONS ON GENERATOR REVERSAL

Q—We sometimes install batteries in such a way that the positive is grounded when the negative should be. The ammeter always reads backwards, showing charge when the generator is working. Does the generator polarity reverse or what does happen? We have seen this

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. *MOTOR AGE* reserves the right to answer the query by personal letter or through these columns.

Emergency inquiries will be replied to by letter or telegram.

done but never saw a discharged battery from it.

2—Why do platinum breaker points work so much better than tungsten points in a high tension magneto?

3—Why does reversing of the shunt leads in a Ford generator kill it?

4—Why do some of the Ford generators have one end of the shunt winding on the third brush and the other on the grounded brush? Does this depend on how or which way the fields are wound?

5—We have a Ford that will do 55 m.p.h. on the road or make the Fresno Speedway mile track in 65 sec. We have De Luxe pistons and Fordson intake valves in it. Since the changes were made the compression does not seem to be so high as before. Would you recommend that we have the cylinder head cut down? Would that give us more speed? We are using the Ford Ignition and Ford gears in the rear axle.—Enns Bros. Garage, Reedley, Calif.

1—A shunt wound generator will generally reverse to conform to the polarity of the battery. However, it is better to install the battery with the proper terminal grounded. Naturally, when the generator reverses the ammeter will give reverse readings. This can be remedied by simply changing the ammeter wires from post to post.

2—The sparking at the magneto breaker point is greater than at battery system breaker points, which causes considerable oxidation of the metal. This effect is also enhanced by the fact that the magneto current is alternating while that of the battery systems is direct. Platinum resists oxidation better than does tungsten.

3—Reversing of the shunt field leads should not kill the generator output but simply reverse it. If a battery current is passed through the generator after the shunt leads have been reversed, you will find that the generator output will be up to normal, but in the opposite direction.

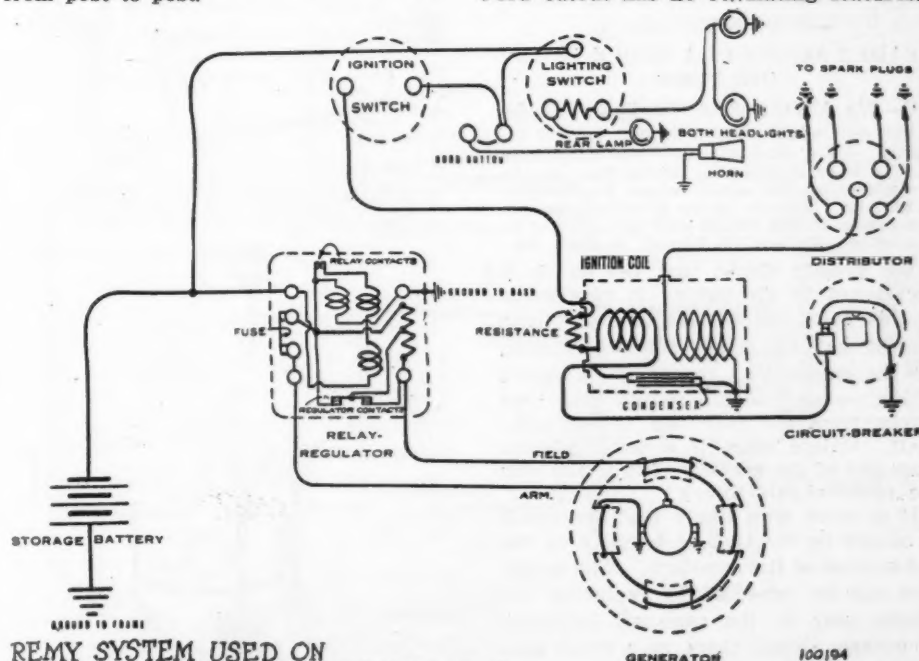
4—The proper method of connecting the fields and brushes is shown in Fig. 3. As said before, reversing this arrangement simply reverses the polarity of the generator.

5—We consider that this car is showing very good speed indeed. Its performance can be bettered somewhat by taking a cut off of the head. This must be done with caution, as if too much is taken off, the valves may strike. A special camshaft and high tension magneto would probably also prove of benefit.

FORD CUTOUT CANNOT BE USED

Q—Advise how to wire up a model 249 D Remy Generator, using a Ford dash type cutout and ammeter. The binding posts on the generator are marked field and armature. Which wire on the generator would cutout and ammeter be on, positive or negative? Advise if the Ford cutout is unsuited for this purpose.—A. Stromer, Gillett, Wis.

Although of the third brush type, this generator depends for regulation upon an exterior regulator which cuts a field resistance into the shunt field circuit when the current output reaches the normal. For this reason it is impossible to use the Ford cutout only. Reference to the diagram shown in Fig. 4 will make the foregoing better understood. The Ford cutout has no regulating features.



REMY SYSTEM USED ON REPUBLIC TRUCKS - MODELS 8-9. GENERATOR MODEL 249 D.

Fig. 4—Remy generator and ignition system as applied to Republic trucks. This shows why a simple cutout cannot be substituted for the regulator-cutout used with this system

LIGHTENING RACING ENGINE FLYWHEELS

Q—We are somewhat confused regarding the point of lightening the flywheel of a Ford engine rebuilt for racing. It seems that many builders and drivers of special Fords are using heavier flywheels while others are using lighter ones. In fact, we remember reading an article in *MOTOR AGE* where a builder removed the magnets from the flywheel. To the best of our recollections this change proved satisfactory. Then in an article appearing July 28th it was recommended that the flywheel be lightened 12 lbs.

We have rebuilt a Ford and have followed your advice with regards to adding weight to the flywheel. We have tried the car out with the added weight (without the magnets) and with the extra flywheel and have found that the heavier wheel is the best; it seemed the car ran with less vibration. It has turned a certain $\frac{1}{4}$ mile track in 37 seconds the record being $\frac{1}{2}$ second better) and we are certain that we could do it in a little better time under more favorable conditions. This speed was attained with a heavy flywheel. Further information on this flywheel subject will be appreciated.—W. A. Ziesing, Missoula, Mont.

As you have noticed, there is considerable confusion upon this point of taking from or adding to the weight of the flywheel. However, all the rebuilders recommend removing the magnets and some of them go so far as to recommend taking a cut off the wheel. Others, like yourself, have had the best results by adding to the weight of the flywheel.

It is true that the heavier wheels will give smoother operation and probably just as much speed on the straightway, but, on the other hand, it is more than likely that the lighter wheel will give a better acceleration and consequent "get-away." Your record of $\frac{1}{4}$ mile in 37 seconds is very good indeed, and we and thousands of our readers would be interested in a detailed description of your car. Unless you are using one of the overhead valve heads, we very much doubt that you can better the record and would recommend that you rest content with the laurels earned.

READER SUSPECTS A KNOCK IN THE OIL PUMP

Q—We have a 1918 4-cylinder Studebaker car which has a knock in the oil pump. This knock came on gradually and is very noticeable while the engine is idling, but is quiet when the engine is pulling. Advise us as soon as possible the cause of the knock and how it can be remedied.—Oliver W. Lloyd, Saxton, Pa.

We greatly doubt that the knock is occasioned by the pump. It may sound at this point but we are of the opinion that it has its origin somewhere else, for the reason that the pump as shown in Fig. — and — is a simple gear type driven from the rear end of the camshaft. Unless there is a tooth missing from one of the gears we fail to see why the pump should knock.

It is more than likely that the knock is caused by the lash or possibly by the end motion of the camshaft. This condition can be remedied by replacing the timing gear or the camshaft bearings. Of course, should there be a great deal of lash in the camshaft and a great deal of wear in the pump gears a lash between the latter would be caused. However, it would have to be of considerable

magnitude to cause a knock. The foregoing reply is based upon the assumption that you have examined the pump and replaced the bearings if they were badly worn.

INSUFFICIENT DATA ON 1914 OAKLAND

Q—We would like some information, if possible, in regards to an 1914 Oakland. We have the rear end down putting on a new pinion gear. We would like to know if there is any adjustment of the pinion gear to the ring? Give diagram.—Robert Cross, New Bedford, Mass.

We are sorry that we cannot be of assistance to you as you have failed to give us sufficient data from which to formulate a reply. There were two distinct models of Oakland cars built in 1914, each of which used an axle of a different type from that of the other. If you will oblige us with the serial number of the car we will be glad to determine the model and render you all the assistance of which we are capable.

POSSIBLY A FLOATING CRANKSHAFT

Q—A 1920 Elcar 4, which has a Lycoming engine, has a slapping noise like loose pins and pistons. This noise is more noticeable with the motor running at 15 m.p.h., and at a slow speed died away under hard strain. When the oil pan was put on there was a hammering noise which disappeared after the pan was removed and replaced. But the slapping and rattling was still there as before the bearings were tightened up. This motor runs fine without rattling at 10 m.p.m. Compression is good; valve tappets are all right. Give advice as to how to adjust

trouble to eliminate slapping noise.—Midway Garage, Selma, N. C.

You do not mention whether or not the shaft was tested for end motion. It is very possible that it is floating to such an extent that the top end of the connecting rod bearings strikes the pistons at times.

Sprung connecting rods will also have the same effect. These points should be carefully checked.

CONVERTING 1918 GRANT 6 INTO SPEEDSTER

Q—We are building a 1918 Grant 6 into a speedster and would appreciate any suggestions that you may give us. We have installed a set of 4 to 1 gears and are having the cylinders rebored and fitted with Deluxe light weight pistons. Could larger valves be installed to any advantage? Would you advise raising the compression a little? With this gear ratio, are 33 x 4 in. tires all right? What speed should we get from this car?—LeRoy Irish, Alliance, O.

The maximum speed of this model N engine of $3\frac{1}{4}$ in. bore and $5\frac{1}{2}$ in. stroke is 2900 r.p.m. It is not likely that it will sustain this speed under load, and 2800 r.p.m. is the maximum to be counted on. The reboring will, of course, have a tendency to increase the power slightly and we would recommend the installation of the larger valves, if this can be done without removing too much stock from the valve seats.

The compression can also be raised to advantage by taking a cut off the cylinder head. This should be done carefully in steps of not more than $\frac{1}{8}$ in. at a time. The raising of the compression should be carried no further than the bearings can tolerate under the resulting increase in power. The 4 to 1 ratio at an engine speed of 2800 r.p.m. should give a car speed of between 70 and 75 m.p.h.

HAS TROUBLE REAMING BUSHINGS

Q—Why is it that wrist pin bushings when reamed have high spots longitudinally? We have tried three different types of expansion reamers with no better results. To get anywhere near a good fit the bushings must be scraped.

2—How are the Keystone reamers sharpened.—James Hill, Evanston, Ill.

1—You are trying to take out too much metal at one cut. The reamers must be very sharp for brass or bronze and set to take a very light cut. It is well to begin with as small a cut as .01 in. After proficiency is attained, this may be increased.

2—These reamers are ground in special jigs by tool experts. We recommend that the work be given to them.

RADIATOR CLEANING MIXTURES

Two mixtures have been found to be very effective in the cleaning out of clogged radiators. When the clogging has been caused by grease, oil, or natural causes, a saturated lye solution, applied hot, is a safe remedy. Clogging from flaxseed anti-leak, or anti-freeze solution requires treatment with muriatic acid and sodium bicarbonate. The latter method is risky, as the acid will attack the metal unless the work is carefully done.

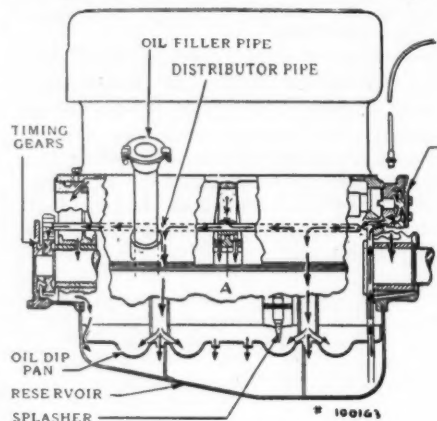


Fig. 5—Lubrication system of 1918 Studebaker, 4-cylinder engine

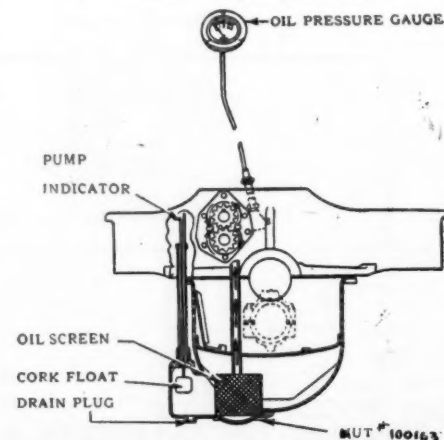


Fig. 6—Another view of Fig. 5 showing the location and arrangement of oil pump

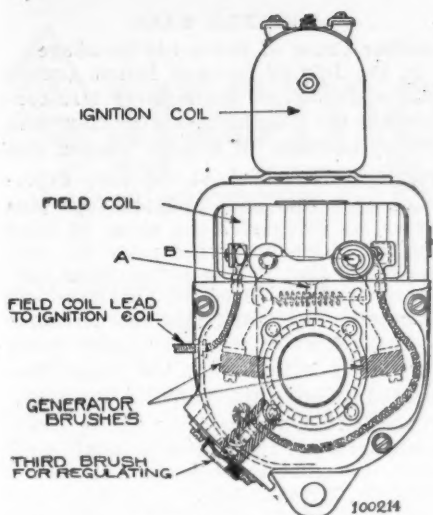


Fig. 7—One model of Delco generator. This shows why the third brush must be "sanded in" every time it is moved

CHANGING VOLTAGE OF DELCO SYSTEM

Q—Is it possible to change the 24 volt Delco system on a Cadillac 4-1913 model car to a 6 or 12 volt system with the same generator and starter? How can it be done?

2—Have you a wiring diagram of this car?—Motor Service Co., Ft. Collins, Colo.

1—The Dayton Electrical Laboratories Co., Dayton, O., or any branch of the United Motors Service will change the unit for you, rewinding it to either the 6 or 12 voltage, as desired. A method of changing the system over to 6 volts for lighting purposes only was explained and illustrated in MOTOR AGE June 2.

2—See Fig. 8.

GENERATOR HAS LOW CURRENT OUTPUT

Q—An Oakland, 8-50, 1916 Model, has a Delco No. 91 Generator which will not put out over 10 amps.—and will do this only when the car runs over 25 m.p.h. We have tested this generator on a test bench and have found nothing wrong, and yet it will not generate over 10 amps. We have tested out the wiring system with a Weston ammeter and found no shorts or grounds. In fact, the generator was tested for output by connecting the ammeter directly to the terminal and it simply would not put out the current until the engine was speeded up. We have put the third brush up as far as we could, without results. Indeed, we have done everything we can think of which would make it charge right up but have been unable to correct the fault.—E. C. Fritz, Oklahoma City, Okla.

Figure 7 illustrates the generator in question. On some of these apparatus it is possible to advance the third brush a trifle more by taking off the brush holder and turning it around. However, we believe your trouble to be due to the fact that you have not seated the third brush after having moved it.

You will see by consulting the illustration that the movement of the brush is not parallel with the contour of the commutator, but at a decided angle thereto. The result is that when the brush is moved, it bears on the commutator with only a sharp edge, thus introducing so much resistance into the shunt field circuit that the fields will not build up in magnetism.

The remedy is to remove the main brushes and holders and with a piece of finest grained sandpaper dress the brush

to a new seat. This is done by raising the brush and placing the sandpaper under it, sand-side up. Be sure that the paper does not work at an angle directly under the brush but that it follows the curvature of the commutator accurately. A few strokes back and forth will be sufficient to dress the brush to the new curvature.

WIRING DIAGRAM OF PAIGE MODEL 651

Q—Publish a wiring diagram of the 1917 Paige Model 651.—J. Edward Peterson, Chicago.

See Fig. 9.

EARLY CAR SERIAL NUMBERS WERE RECENTLY PUBLISHED

Q—Do you publish anything which will give us the numbers showing us how to tell the age of a car for years earlier than 1918? We have your list published in 1918.—Rosenberg Motor Co., Lexington, Nebr.

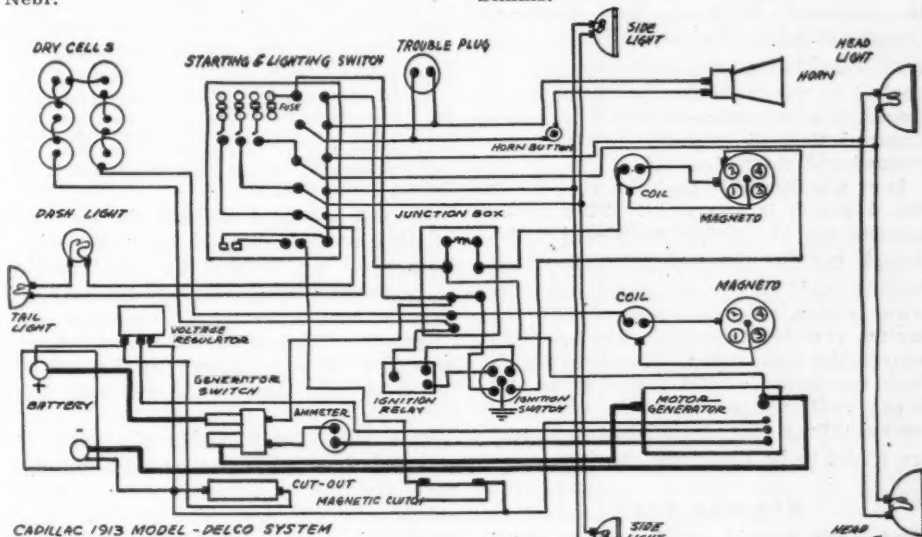


Fig. 8—Wiring diagram showing all circuits of the Delco system used on the 1913 Cadillac cars

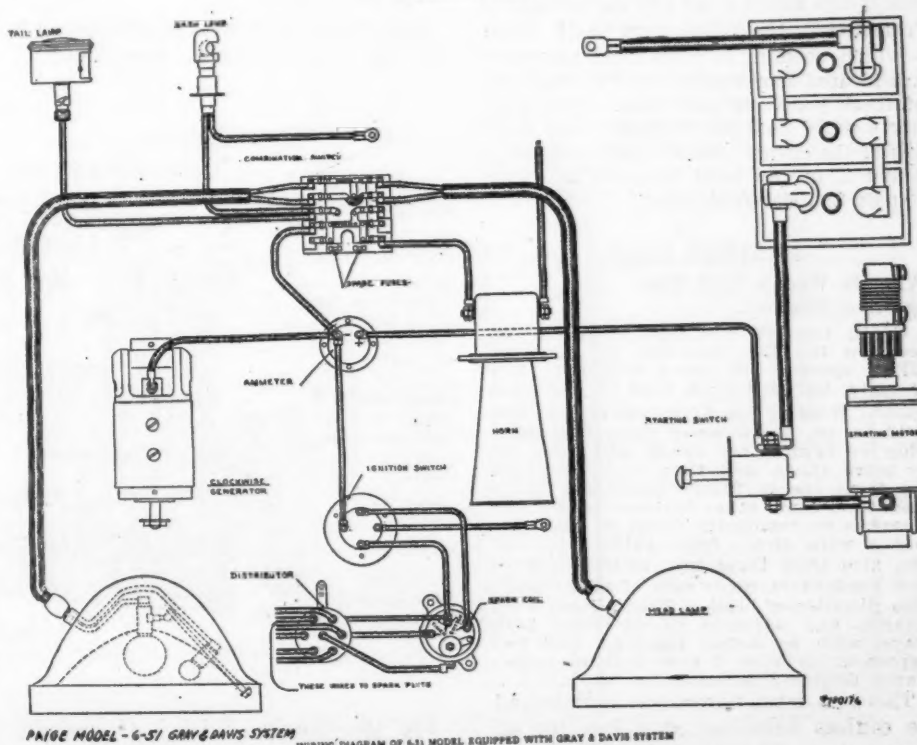


Fig. 9—An external diagram of the Gray and Davis equipment of the Paige-Detroit model 6-51

1—Yes. MOTOR AGE recently completed the publication of the serial numbers of automobiles covering those cars produced for several years prior to 1918. These numbers can be found by referring to the back files for 1921.

LIST OF MAGNETO EQUIPPED CARS

Q—We have been informed that there are only two different makes of cars that use magnetos, and we are interested in having this information verified. Can you tell us the names of all passenger cars that now use magnetos?—Fyrac Manufacturing Co., Rockford, Ill.

Following is a list of passenger cars now using magnetos, together with the make of the system used: Brewster 91, Chandler, Cleveland 40, Climber S-6, Dorris 680, Raleigh 122, Roamer 6-54-D, Wasp, Bosch; Holmes Series 4, Mercer 5, Eiseman; Locomobile 48, McFarlan 1921, Porter 46, Berling; Meteor R and RR, Simms.

MYSTERY TALE

One Piston Is Under-Lubricated

Q—Publish what you believe to be the trouble with two or three model K-45 Buicks. The number six pistons get dry as if there was no oil in the crankcase, when there is plenty of oil and the pump working properly. The bearing has oil for almost one inch up to the connecting rod. The rest of the rod and the pistons look as if they had been red hot.

Another trouble is that the engine heats with plenty of oil and water and both pumps working. After the car has been running five or six blocks at the rate of 35 m.p.h., the engine continues to run for 25 or 30 seconds after the switch has been turned off. Sometimes it will start backwards and the gears have to be engaged to stop it. On the whole, it acts like an engine that has been run without water. The cause of this cannot be charged to the carbon, as we have just cleaned it out.

The illustration, Fig. 10, shows that the path of the oil is from the oil pump to a main distributing pipe which is supposed to keep the crankcase troughs filled to the proper level. It is very possible that sediment has been deposited in the main pipe until the No. 6 trough is being under-supplied. We recommend that the pipe be carefully examined and cleaned.

It is also possible that the ring fit on No. 6 piston is too tight. This would account for the piston running hot, although not for the heating of the connecting rod. It is suggested that the lower piston ring be removed and the engine run to determine whether this betters the lubrication. The heating effects mentioned would result from any of the faults above suggested. It will be remarkable if the cylinder and piston are found to be free from scoring.

MYSTERY TALE

Mysterious Squeak Is Found in Hood Hinge

We have found that the most mysterious things about a car are the squeaks—"canaries," the customers call them—which, seeming to come from one point are located somewhere else. We had one of these problems last week. After having decided that the squeak came from one of the spring shackle bolts we finally found it in the hood hinge.—Case Auto Repair Co., Hartford, Conn.

MYSTERY TALE

What Is Wrong With This Ignition System?

Q—In the Atwater-Kent ignition system, on the 1921 Maxwell at very low idling speeds, the spark will not jump steadily, but will work well at any other speed. Holding the high tension terminal 1/16 in. or 3/8 in. away from the spark plug or engine, the spark will miss one or more shots, and then will work fine for from one to fifteen minutes. In the meantime some other cylinder is missing. There is no regularity about it. We have run a wire direct from battery to coil, and also tried three new coils and three new condensers, made sure of all grounds, also distributor block. Points have been cleaned and adjusted to extremes both ways, with no better results. This has happened on 4 or 5 new 1921 models.—Harry Grinnell, Minneapolis, Minn.

This is a most uncommon trouble and we confess ourselves at a loss for an explanation. The apparatus in question

has enjoyed an enviable reputation for reliability for a number of years and we question that the fault will be found in it. Rather do we believe that the cause is to be found in one of the wires or connections between the battery and distributor. The comment of our readers is invited.—Ed.

MYSTERY TALE

Six-Cylinder Engine Knocks Out Bearings

Q—Some time ago we wrote in regarding the bearings of a Willys Six. You suggested the crankshaft's being out of line or sprung, thus causing the connecting rod bearings to loosen or burn out.

We have replaced every bearing in the engine, turned the crankshaft, installed new pistons, wrist pins and rings, ground the valves and removed the carbon. Thus the engine should have been in first class condition. The car was driven at a rate of speed not exceeding 25 m.p.h. for 400 or 500 miles, and by that time the connecting rod bearings were as loose as they ever had been, as we took out from 2 to 4 shims from each.

What do you suppose is the trouble? Is it possible that the bearings are too soft? Where can we get a bearing that will stand up in this engine, a Red Seal Continental of 45 or 50-hp?—Frank Den Beste, Corsica, S. D.

We can hardly credit that the bearings in this engine are of poor material. Rather do we believe that the trouble is to be attributed to poor lubrication. After having fitted the new pistons and rings, the lubricating oil should have been drained and replaced at the end of the first 100, the second 200 and the 500-mile period. This, for the reason that microscopic particles of iron were polished from the pistons and, mixing with the oil, constituted a very good abrasive which wore the new bearings rapidly. It is recommended that new bearings be purchased from the engine manufacturer, The Continental Motors Corp., Detroit.

Any other theory with which our readers may favor us will be appreciated.

MYSTERY TALE

Another Cause of Rotor Pin Breakage

In the July 28 issue of MOTOR AGE we read with interest the mystery tale concerning the breaking of the pin that drives the rotor of a high tension distributor. We had about the same experience on a Reo Six. It broke four pins before we discovered the cause of their breaking. We blued the rotor all over and found that it was not striking anywhere, so we removed the generator and distributor and found that the drivegear on the generator was very badly worn. Our theory is that when the engine was speeded up and then slowed down quickly, the backlash caused the pin to break. A new gear on the generator shaft remedied the trouble.—Raymond O. Honer, Colorado Springs, Colo.

MYSTERY TALE

Punctured Vacuum Tank Float Presents Mystery

Some time ago a customer of ours had some trouble with his engine. He could not get it to run steadily. Perhaps it would run satisfactorily for fifteen minutes, then it would stutter and load up. The upshot of the affair was that after a long search a defective vacuum tank float and valve mechanism was discovered. A new cover, valve and float cured the trouble.—W. E. Markle, 2751 California Court, Lincoln, Nebr.

MYSTERY TALE

Steering Gear Moves Throttle Control

Q—What would cause a Ford car to speed up when climbing a grade with the steering wheel turned to the right, and to slow down with it turned to the left? The throttle lever stays at the same position.—Claude Press, Blue Ridge, Tex.

We are of the belief that the bottom anchorage of the steering column is loose on the frame. This would allow the whole column to twist and, of course, move the throttle linkage. (Who has another idea? Ed.)

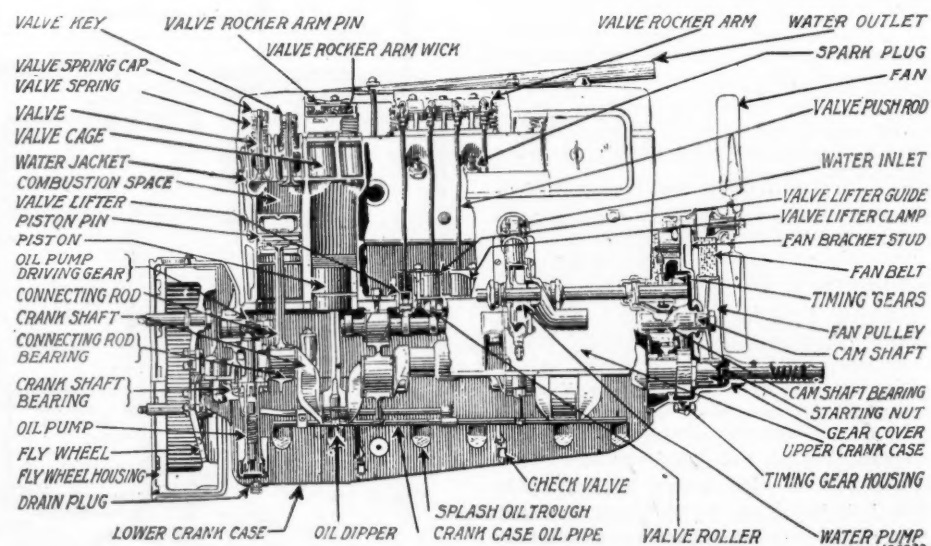


Fig. 10—How the Buick K 45 engine is lubricated. Each splash oil trough is independently supplied by the crankcase oil pipe

Automotive Architecture

Planning & Building Problems

Conducted by Tom Wilder

Not Enough Space for Filling Station

PLAN NO. 365

Q—Give us your advice on a garage 50 by 70 ft. We would like to have a small filling station as shown in the rough sketch, but we don't want to use too much space. The building will be one story in height. How many cars will it hold? How much space can we give the office and filling station and yet have enough for cars along the side? We want to make the best showing on the Franks-town Avenue side for it is a busy street. —Joseph Teresi, Pittsburgh, Pa.

It would be impossible to use a filling station of the proportion you propose. One car would fill it completely and the pump would necessarily have to be placed at one side; then the center-fill cars would project over the sidewalk. If you cannot devote more space to it a curb pump would be much better. If ordinances prohibit you from having curb pumps a layout, something as we show in our plan, will be about the best you can do. This station, while it is of the minimum size, cuts into your space quite seriously, so that unless there is a chance for large profits from the sale of gasoline it might be better business to discard the filling station.

It is certain that motorists prefer to patronize stations having plenty of room. They do not like to wait their turn at the pump, especially where the station does not provide liberal road space for waiting.

Sales and Service Building on Busy Corner

PLAN NO. 366

Q—Please arrange a plan for a sales and service building to be built on a corner lot 99 by 165 ft. Both streets are heavily traveled and considerable tourist traffic passes; consequently, we will want a storage garage.

We want a large showroom and everything in proportion to make an up-to-date Marmon and Franklin agency for sales and service.

The basement had better be for storage, the first floor for sales, adjustments, used cars, demonstrators, etc., while all overhauling and repair work will be on the upper floor. —M. J. Dobson, 261 Oliver Bldg., So. Bend, Ind.

This plan would be greatly improved if an additional 10 ft. of land could be obtained. That would give the longitudinal aisles each 6 ft. more width and make the handling of long cars like Marmon much easier. There are, however, thousands of garages with 50 ft. storage spaces and while the extra 5 ft. would be desirable it can be dispensed with.

The basement in this layout is given over to garage purposes. It is reached

Automotive Architecture

IN this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

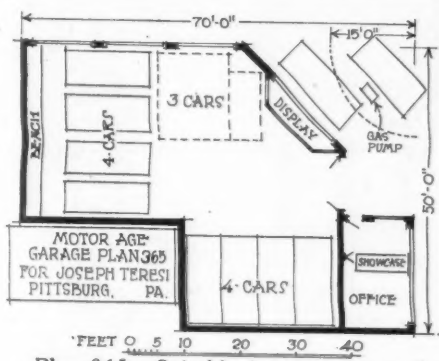
What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

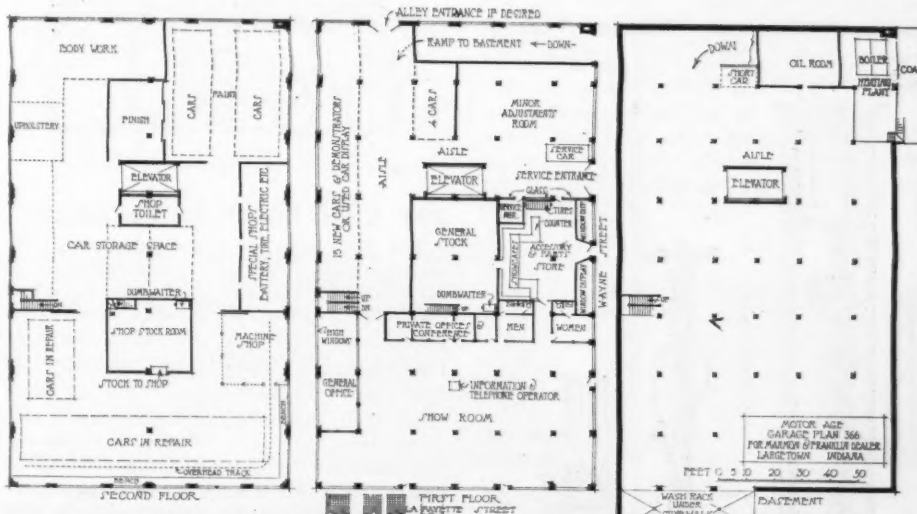
Number of cars it is expected to garage.

Number of men employed in repairshop.

And how much of an accessory department is anticipated.



Plan 365—Suitable for a garage and curb pump



Plan 366—Suitable for a sales and service building

by elevator or by ramp, entrances to both of which are near the rear on the Wayne street side. Under the ramp is the oil room; under the sidewalk on the Wayne street side is the coal bin, while on the LaFayette side is the washrack where sidewalk lights give good illumination.

On the first floor the showroom is extensive enough to display rather complete lines of Marmon and Franklin cars, while the general offices, private offices and waiting rooms are handy. Customers must pass through the accessory store to reach the waiting room and it will often happen that they will do all their waiting in the store, to the advantage of the store. The back part of floor is given over to minor adjustments, storage of demonstrators, general stockroom and used cars.

The third floor is divided roughly into three sections. In the center, adjacent to the elevator, is car storage space for about 15 cars, while at the front is the general machine repairshop.

The rear is devoted to body work and painting and along the windows on the Wayne street side are some small special shops. The shop stockroom is centrally located and connected by narrow stairway and dumb waiter with the main stockrooms on the first floor.

The top floor needs lots of light and should have two rows of skylights, one on each side of the center.

The roof should be trussed to give the greatest freedom of movement on the top floor.

If found more desirable the storage garage may, with a few changes, be moved to the second floor position and the shops installed on the third floor, eliminating the basement except a small section for the heating plant.

The Accessory Show Case

New Fitments for the Car

CANT-LEAK TIRE PUMP USES PISTON RINGS

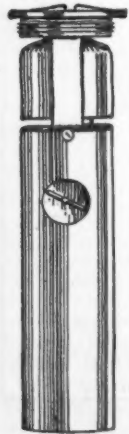
Three piston rings and a feather valve feature this pump. The piston extends flush to the bottom of the barrel on the down stroke, thereby forcing all the air beyond the ball check valve into the pump base casting. This ball check prevents the compressed air in the hose from backing into the pump on the upward stroke of the piston. The pump barrel is made of seamless steel tubing with bright inside finish and a lapped piston ring. Manufactured by Multiple Boring Machine Co., 2212 Washington Ave., St. Louis.

NEW CYLINDER HEAD GASKET HAS FIBRE TOP

A departure in cylinder head gasket construction is shown by the gasket manufactured by the Victor Manufacturing & Gasket Co., 5750 Roosevelt Road, Chicago. The new gasket is practically identical with the conventional type of asbestos lined copper and brass gasket, with the exception that the top sheet is of a special non-absorbent, heat-resisting fibre of great mechanical strength. Aside from the fact that the fibre surface is less liable to stick to the cylinder head than the metallic sheet, it is claimed that the new gasket is cheaper to produce and that consequently it sells at a lower price. It is made in two types, the Victor Number 101-A, in which the outer edge is turned over, making a closed gasket, and the 101-B, with plain edges.

IRREVERSIBLE STEERING GEAR FOR FORDS

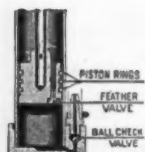
This steering gear of worm irreversible type is designed to replace the regular Ford steering equipment. Road shocks at front wheels cannot be transmitted through it to the driver's arms. It bolts to the frame of the car and can be installed without drilling holes or cutting rods. Price, \$30. Sprague Tire & Rubber Co., Omaha, Nebr.



Gasolarm gasoline signal



Cant-leak tire pump

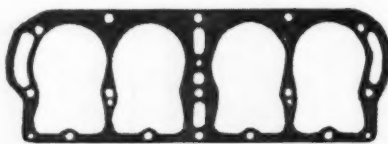


Stafford carburetor



Compact soldering kit

Worm steering gear for Fords



Fibre top cylinder head gasket

DOT HIGH PRESSURE LUBRICATOR

The Dot high pressure lubricator has an automatic valve which opens and closes as the gun is attached or detached from the nipple. To use this gun place nozzle end over nipple. A quarter turn of the gun to the right clamps it securely to the nipple. After a bearing has been lubricated, the valve closes automatically upon detaching and retains the remaining pressure. Nipples for this lubricator are made in all the various forms necessary to facilitate its attachment to any oiling point on the chassis. Carr Fastener Co., Boston.

COMPACT SOLDERING KIT IS HANDY IN SHOP OR CAR

A very compact soldering kit designed for the mechanic's equipment, or as part of the tool complement of the motor car, consists of a small alcohol blow-torch, one bar of aluminum solder, one coil of self-fluxing wire solder, and four patches, two of sheet tin and two of aluminum. Small repairs can be made without the use of a soldering iron. The outfits come to the dealer packed in cartons of 12 boxes. Priced at \$1.50 each, or \$18.00 per carton the outfits are marketed by the Brown Supply Co., 15 Chardon Ave., Boston.

AUTOMATIC BELL ALARM WARNS OF LOW GASOLINE SUPPLY

Said to operate when the fuel supply has fallen to the two or five gallon level, the Gasolarm, made for installation in either Ford or Chevrolet gasoline tanks, gives an unmistakable, insistent warning that it is time to refill. In fact, it gives several warnings before the final one as, every time a corner is rounded, the variation in the gasoline level sets it off.

The mechanism of the device is simple, consisting of a clock works, a float and a bell. The whole is contained in a cylindrical body which is inserted into the tank through the filler hole, a threaded top piece taking the place of the regular filler cap. Priced at \$2.50, the device is produced and marketed by The Gasolarm Co., 2541-43 Schubert Ave., Chicago.

NEW STAFFORD CARBURETOR

In this carburetor an automatic air valve regulates the flow of air and a meter pin and tapered orifice the flow of fuel. The fuel is sprayed into the air stream through a number of minute jets, spaced around the distributor head. The only adjustment is made by screwing the tapered orifice, at the bottom of the carburetor, up or down until the correct adjustment is obtained. This adjustment is made at idling speed and is then correct for all other speeds. Prices range from \$20 to \$50. Jones-Niehoff Mfg. Co., Los Angeles, Calif.



Dot high pressure lubricator

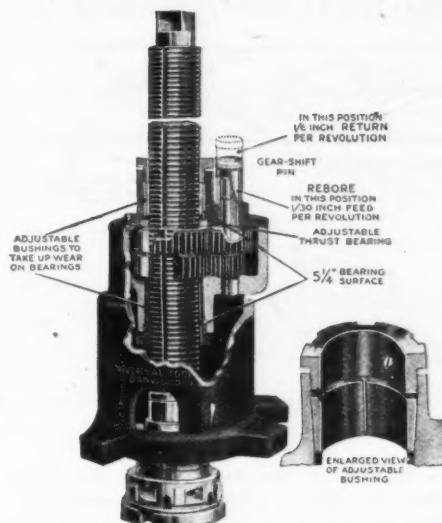
Service Equipment

Time Savers for the Shop

THIS ALIGNING MACHINE TRUES WIRE WHEELS

The purpose of a new wheel-truing apparatus manufactured by G. F. Kight, Norfolk, Va., is to face off the web of a wooden wheel after the hub flanges have been removed. The facing tool and holder slide on a bar and are fed out by turning a hand crank.

The apparatus is so designed that the spindle can be quickly changed to accommodate wood or wire wheels. The truth of the wheel is indicated by a pointer and the high and low spots are equalized by adjusting the spokes without removing the wheel from the stand.



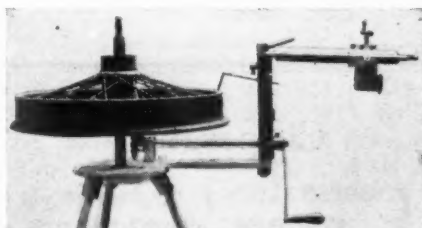
Universal cylinder reboring tool

COMPLETE BATTERY REPAIR KIT CONSISTS OF FEW PIECES

A storage battery repair outfit with which, it is claimed, most of the operations of battery maintenance may be performed, consists of a pair of special pliers, a lead cutter with a leverage of 20 to 1, powerful enough to shear heavy pillar posts easily, a battery knife especially designed to get into corners, a coarse rasp, a fine file and a ball pein hammer. Priced at \$8.50, the complete outfit may be purchased from Heller Brothers Co., Newark, N. J.

"RED DEVIL" ALL STEEL SCREW-DRIVER

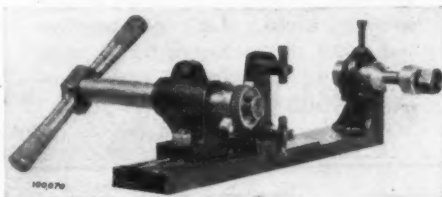
Made with a hollow handle, the all steel "Red Devil" screwdriver has many advantages over the conventional type of tool, among which is a combination of lightness and strength. The tool is made of two drop forgings which, after being shaped under the hammer, are welded together. The handle indicates the amount of careful thought expended on the design, being knurled to give a firm grip and slightly flattened on the end and sides so that it makes a serviceable hammer.



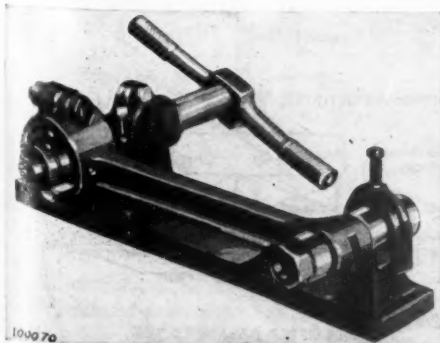
Aligning machine for truing wire wheels



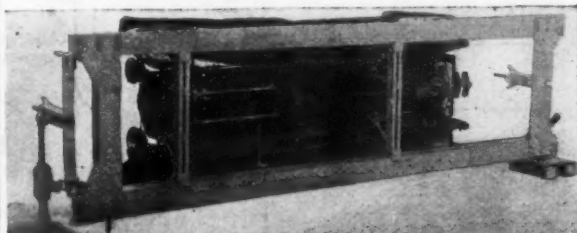
"Red Devil" all-steel screwdriver



Morenco connecting rod reamer and aligner



Morenco connecting rod reamer and aligner



Automobile cradle for turning cars on side to facilitate service

MORENCO CONNECTING ROD REAMER

The Morenco universal connecting rod reamer and aligner is really what might be called an adjustable jig, for the reason that it can be instantly set to accommodate all lengths of automobile engine connecting rods. It is so constructed that the rod is clamped in position at exact right angles to the cutter-head center, so that when the crankpin bearing has been reamed it will fit the crankpin at a perfect right angle to the crankshaft center.

It is claimed that with the ten sets of blades comprising the complete outfit, any mechanic's helper can finish any size bearing within .0001 in. of the crankpin size, as the adjustment of the cutter-head is fine enough to allow the cutter blades to be moved this small amount in unison. Manufacturer, Moore Engineering Company, Hagerstown, Md.

AUTOMOBILE CRADLE TURNS CAR OVER ON SIDE

This powerful apparatus lifts a car off the ground and rotates it so that its under portions are easily accessible. The car is run onto two angle iron tracks and clamped in position. Two jacks, one at each end, are then used to raise it off the ground. A card is furnished with the machine which shows the height of the center of gravity of the various makes and models of cars, and the points of support are set at this point as nearly as possible so that the car can be turned with very little effort. Priced at \$450, the device is supplied by the Morrison Mfg. Corp., Pittsburgh.

UNIVERSAL CYLINDER REBORING TOOL

This reboring tool is operated by hand, drill press or power drive attachment. It is claimed all types of engines, closed or detachable head, can be rebored without removing the block from the chassis. The wearing parts are adjustable. This tool is portable, weighing 40 lb. completely assembled. The cutter head has universal adjustment. Made in several sizes to fit all engines. Universal Tool Co., Inc., Garwood, N. J.



Heller Bros. storage battery repair outfit

Automotive Repair Shop

Practical Maintenance Hints

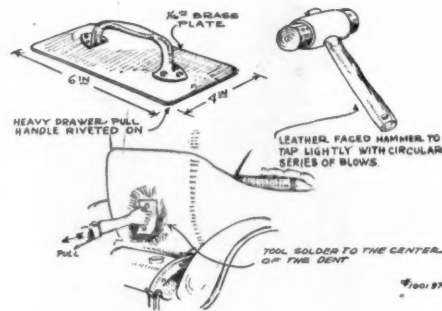
Handy Tools Designed by Ingenious Reader

I AM sending two sets of sketches for some special tools which I have designed and find very handy, and which experience has proven to be very well adapted to their separate uses. One shows a tool for unscrewing the valve caps on Hudson 6-40 and some Continental engines. The tool has two screws, one to fit the $\frac{7}{8}$ in. S. A. E. spark plug hole and the other a smaller thread to fit the $\frac{1}{2}$ in. pipe thread hole for the priming cock. The dimensions are very close to actual measurement.

I have only shown the $\frac{7}{8}$ in. screw, the $\frac{1}{2}$ in. being the same except for the thread end, which tapers down to the $\frac{1}{2}$ in. pipe thread size. Although there is not much choice between them, the former tool is the more valuable. For grinding Hudson Super Six valves I am a great advocate of spring removal. Some mechanics may leave them in on account of the great difficulty of replacing them, but this is not necessary if the tool is used.

To make, take about one foot, for generous measure, of $\frac{3}{4}$ -in. angle iron and also purchase a pair of ordinary stamped steel valve lifters at any good accessory store. Cut two pieces of angle iron $4\frac{1}{4}$ in. over all. Next, cut out a $\frac{3}{4}$ -in. section from the side of one of the pieces as roughly indicated in the sketch. Now have the tipped ends bent over at right angles and welded to the ends of the short angle. Then weld the tip of the spring lifter to the sides of the two pieces as shown in the other sketch.

File out with a round and half-round file the top and bottom ends of the forward angle iron so the valve stems can be put through the spring. To use, compress the spring and washer in the vice, using a piece of keystick between the vice paws and spring so the spring can



Handy tool for removing dents from automobiles

be caught in the tool. Close the jaws over the spring after it has been sufficiently compressed and released from the vice. The spring will now be held in place in the tool, ready for application to the valve.—W. E. Markle, 2751 California Court, Lincoln, Nebr.

Cooperation

COOPERATION is the keynote of the automotive industry this year and will become more important as time goes on. Motor Age is pleased to extend an invitation to its readers, wherever they may be, to contribute short articles and sketches on easy or improved ways of doing hard things, which they may have worked out and thus lend their aid in HELPING THE OTHER FELLOW. Correspondence among contributors is also strongly urged. Let's get together and make this a happy family with one end in view, that of hearty, unselfish COOPERATION.

Tool for the Removal of Dents from Automobiles

The tool illustrated herewith is used for removing dents or buckles from the bodies or tanks of automobiles where the opposite sides of the dents are not accessible. It consists of a piece of sheet brass about $\frac{1}{8}$ in. thick, 4 in. wide and 6 in. long, to which an ordinary heavy drawer handle is riveted solidly. The opposite face of the brass is heavily tinned with solder.

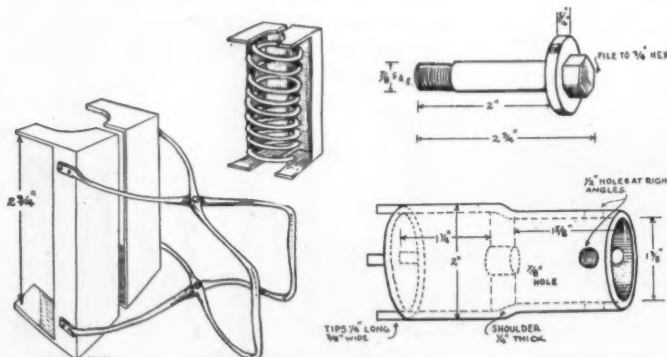
In repairing a dent the center, for an area the size of the brass, is scraped off and cleaned with soldering acid. The brass is then bent to conform to the surface of the dent and the tool is sweated on with the aid of a blow torch.

One mechanic pulls hard against the handle and another strikes lightly with a leather-faced mallet all around the dent, in a circular series of blows. The dent will invariably respond to this treatment and the metal come back to its former shape. The tool is then removed by heating thoroughly with the torch and the solder is wiped off the body while hot.

Some body enamel of the right color then is applied, and the job is complete.

Steering Connection As an Engine Lifter

The yoke type of steering connector in the tie bar of an automobile steering gear can be used in conjunction with one of the cylinder head bolts for attaching the crane or hoist hook in swinging an engine in or out of a car. This arrangement is shown in the accompanying illustration. The bolt is fitted or screwed into one of the bolt holes in the middle of the block, and the engine can be swung about on this pivot and rested on the bench in the desired position. Apart from being an inexpensive contrivance for lifting, it is simpler and more convenient to attach than chain, cable or rope.



Make of Tires—Type of Rims Used on 1921 Passenger Cars

Motor Age Maintenance Data Sheet No. 166

One of a series of weekly pages of information valuable to service men and dealers—save this page

Car and Model	Make of Tire	Size of Tire	Type and Make of Rim
Dort, 17A	Goodyear	31 x 4	C. Cleveland
Dupont—			
Roadster	Goodrich	32 x 4	S. S. Firestone
Touring and sedan	Goodrich	32 x 4½	S. S. Firestone
Elcar, 7-R	Firestone	33 x 4	S. S. Stanweld
Elgin Six	Optional	33 x 4	S. S. Firestone
Essex, 1921	Optional	32 x 4	S. S. Kelsey
Fergus, 6	Optional	32 x 4	S. S. .
Ferris, C-21	Firestone	32 x 4½	S. S. Disk Steel Wheel
Ford, T	Choice of various makes	30 x 3½	Wood Artillery
Franklin, 9B	Goodyear	32 x 4	S. S. Q. D. Goodyear
Friend Four	Firestone	32 x 3½	S. S. Perlman
Gardner—			
Touring and roadster	Goodyear	32 x 3½	S. S. Jaxon
Sedan	Goodyear	32 x 4	S. S. Jaxon
Globe, B-10	Optional	32 x 4	S. S. Firestone
Grant Six	Choice of various makes	32 x 4	S. S. Firestone
H. C. S. Series	Goodrich	32 x 4½	S. S. Stanweld
Halliday, 21	Firestone	33 x 4	S. S. Firestone
Handley-Knight		32 x 4½	S. S. Firestone
Hanson Six	Goodrich	32 x 4	D. S. S. Kelsey
Harroun, AA-2	Miller	30 x 3½	Q. D. C. Stanweld
Hatfield, A-42	Firestone	32 x 4	S. S. Firestone
Haynes, all models	Choice of various makes	34 x 4½	D. S. S. Firestone
Holmes, 4	Goodyear	34 x 4½	S. S. Firestone
Hudson Super Six	Optional	34 x 4½	S. S. Kelsey
Huffman, R		32 x 4	S. S. .
Hupmobile, R	Goodyear	32 x 4	S. S. Kelsey
Jackson, 6-38—			
Touring	Goodyear	33 x 4	S. S. Jaxon
All others	Goodyear	32 x 4½	S. S. Jaxon
Jordan—			
M		32 x 4	S. S. Firestone
F		32 x 4½	S. S. Firestone
Kenworthy, 8-90	Goodrich and Firestone	32 x 4½	Wire or Distel Wheel
King, H	Goodrich	32 x 4½	S. S. Firestone and Stanweld
Kissel, 45	Goodyear and Firestone	32 x 4½	S. S. Firestone
Kline Kar, 6-55-K	Goodyear	32 x 4	S. S. Firestone
Kurtz Automatic, A	Optional	32 x 4	S. S. Firestone
Lafayette, 134	Firestone	33 x 5	S. S. Firestone
Leach, 21A, B and C	Goodyear	32 x 4½	S. S. Wire and disk wheel
Lexington—			
S	Optional	32 x 4	S. S. Kelsey
T	Optional	32 x 4½	S. S. Firestone
Liberty—			
10C, open	Goodyear	32 x 4	S. S. Firestone
10C, closed	Goodyear	33 x 4½	S. S. Firestone
Lincoln	Choice of various makes	33 x 5	S. S. Kelsey

Continued next week

Abbreviations: "C." clincher, "S. S." straight side, "Q. D. C." quick detachable clincher, "Dmtbl." demountable.

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan				
Acc. Guy	G	6-3 1/2 x 5	123	32x4	\$2975	\$2975	...	\$3680	\$3680	Maibohm	B	6-3 1/2 x 4 1/2	116	32x4	\$1575	\$1575	\$1575	\$2395	\$2395				
Acc. H	H	6-3 1/2 x 5	123	32x4	2975	2975	...	3680	3680	Marmen	34	6-3 1/2 x 5 1/2	136	32x4 1/2	4185	\$3985	3985	4875	5275				
Acc. L	L	4-3 1/2 x 5	110	32x4	1385	1385	...	2195	2195	Maxwell	25	4-3 1/2 x 5 1/2	109	30x3 1/2	845	845	1445	1545					
Allen	Series 43	4-3 1/2 x 5	110	32x4	1385	1385	...	2195	2195	McFarlan	1921	6-4 1/2 x 6	140	33x5	6300	6300	7500	7500					
Ambassador	R	6-3 1/2 x 5 1/2	136	33x5	14500	\$4500	...	6500	6500	Mercer	Series 5	4-3 1/2 x 6 1/2	132	32x4 1/2	3050	\$3050	3050	5150	5650				
American	C	6-3 1/2 x 5	127	32x4	2195	2195	12350	3150	3150	Merit	Cont.	6-3 1/2 x 4 1/2	119	32x4	2245	2245	...	...	...	
Anderson	Series 40	6-3 1/2 x 4 1/2	120	32x4	2195	1795	1845	2795	2795	Metcor	R & RR	4-4 1/2 x 6	129	32x4 1/2	5500	5500	...	...	...	
Apperson	8-21-S	8-3 1/2 x 5	130	34x4 1/2	...	3000	3250	4500	4500	Metz	M6	6-3 1/2 x 5	120	32x4	1995	1995	2795	2895	...				
Apperson	Anniversary	8-3 1/2 x 5	130	34x4 1/2	...	3500	3750	...	...	Mitchell	F-40	6-3 1/2 x 5	120	33x4	1490	1490	2590	2690	...			
Auburn	6-51	6-3 1/2 x 4 1/2	121	32x4	1670	1695	1760	2475	2495	Mitchell	F-42	6-3 1/2 x 5	127	33x4	...	...	1795	...	...		
Beggs	29T	Cont.	6-3 1/2 x 4 1/2	120	33x4	1775	1775	2675	2775	Moller	A	4-2 1/2 x 4	100	27x3 1/2	2000	...	...	...	...
Bel	4-32	H-S.	4-3 1/2 x 5	114	31x4	1495	1495	...	...	Monroe	S-9 & 10	4-3 1/2 x 4 1/2	115	32x3 1/2	1285	1295	...	...	...	
Bel	6-50	H-S.	6-3 1/2 x 5	124	32x4	1695	1695	...	...	Monroe	S-11 & 12	4-3 1/2 x 4 1/2	115	33x4	...	...	2075	2175	...			
Biddle	B1	Buda.	4-3 1/2 x 5 1/2	121	32x4	3475	3475	...	3975	Moon	6-48	Cont.	6-3 1/2 x 4 1/2	122	32x4	1985	1985	2475	2985	...			
Birch Super-Four	H-S.	4-3 1/2 x 5	117	32x4	1195	1195	1245	2295	1795	Moon	6-68	Cont.	6-3 1/2 x 5 1/2	125	32x4 1/2	2415	2415	3485	...	...	
Birch Light Four	Lo.	4-3 1/2 x 5 1/2	108	30x3 1/2	1045	1045	...	...	...	Murray-Mac Six	...	6-3 1/2 x 5 1/2	128	34x4 1/2	4250	4250	...	...	...	
Birch Light Six	H-S.	6-3 1/2 x 5	117	33x4	1395	1395	1445	...	...	Nash	681-7	6-3 1/2 x 5	121	33x4	1525	1545	1415	2395	2695	...	...
Bour-Davis	21S	Cont.	6-3 1/2 x 5 1/2	126	33x4 1/2	2385	2385	...	...	Nash	682	6-3 1/2 x 5	127	34x4 1/2	...	1695	...	...	...	...
Brewster	91	Own.	4-4 x 5 1/2	125	32x4 1/2	7000	7000	10500	10500	Nash Four	41-A	4-3 1/2 x 5	112	32x3 1/2	1175	1195	1735	1935	...	...	...
Brook	4-34	Own.	4-3 1/2 x 5	109	31x4	1085	1085	1685	1685	National Sextet	BB	6-3 1/2 x 5 1/2	130	32x4 1/2	2990	2990	3990	3990	...	...	...
Brook	S-21 A	Own.	2-3 1/2 x 3 3/8	90	28x3	395	395	...	...	Nelson	D	4-3 1/2 x 4 1/2	104	32x4	1750	1750	...	...	...	...	...
Buick	1922-34-35-36-37	Own.	4-3 1/2 x 4 1/2	109	31x4	935	975	1475	1650	Noma	1C	Cont.	6-3 1/2 x 4 1/2	128	32x4	2860	2860	3700	3700	...	...	...
Buick	1922-44-5-6-7	Own.	6-3 1/2 x 5	118	33-4 1/2	1495	1525	2135	2435	Northway	...	6-3 1/2 x 5 1/2	128	33x5	4200	4200	5600	5400	...	...	...
Buick	1922-49-9-50	Own.	6-3 1/2 x 4 1/2	124	34x4 1/2	...	...	1735	2325	Norwalk	430-KS	Lyc.	4-3 1/2 x 5	116	32x3 1/2	1635	1635	...	...	...	...	...
Bush	E.C.4	Lyc.	4-3 1/2 x 5	116	33x4	1195	1195	...	...	Oakland	34-C	Own.	6-2 1/2 x 4 1/2	115	32x4	1095	1165	1425	1625	1725	...	...
Bush	E.C.6	Rut.	6-3 1/2 x 5	116	33x4	1345	1345	1750	1850	Ogden	6-60	Own.	6-3 1/2 x 5 1/2	134	33x5	3750	3900	5000	5400	...	...	...
Cadillac	59	Own.	8-3 1/2 x 5 1/2	132	35x5	3790	3790	4950	4950	Oldsmobile	43-A	Own.	4-3 1/2 x 5 1/2	115	32x4	1145	1145	1645	1845	...	...	...
Carroll	C	Roach.	6-3 1/2 x 5	128	32x4 1/2	3185	3185	3940	3940	Oldsmobile	37-A	Own.	6-2 1/2 x 4 1/2	112	32x4	1450	1450	2145	2145	...	...	...
Case	V	Cont.	6-3 1/2 x 5 1/2	126	34x4 1/2	2250	2250	2900	2900	Oldsmobile	46	Own.	8-2 1/2 x 4 1/2	122	33x4 1/2	1725	1725	2635	2635	...	...	...
Chalmers	6-30	Own.	6-3 1/2 x 4 1/2	117	32x4	1495	1545	2295	2445	Oldsmobile	47	Own.	8-2 1/2 x 4 1/2	115	32x4	1625	1625	2185	2425	...	...	...
Chalmers	6-30	Own.	6-3 1/2 x 4 1/2	122	33x4 1/2	...	...	1795	...	Overland	4	Own.	4-3 1/2 x 4	100	30x3 1/2	695	695	1000	1275	...	...	...
Champion	Tourist	Lyc.	4-3 1/2 x 5	113	32x3 1/2	1095	1095	...	...	Packard	Single-Six	Own.	6-3 1/2 x 4 1/2	116	33x4	2975	2975	3650	3975	...	...	...
Champion	Special	H-S.	4-3 1/2 x 5	118	32x4	1395	1395	...	...	Packard	12-3 x 5	Own.	12-3 x 5	136	35x5	4550	4850	6600	6800	...	...	...
Chandler	Six	Own.	6-3 1/2 x 5	123	33x4	1785	1785	2785	2885	Paige	6-42	Own.	6-3 1/2 x 5	119	32x4	1635	1635	2450	2570	...	...	...
Chevrolet	490	Own.	4-3 1/2 x 4	102	30x3 1/2	625	625	975	975	Paige	6-66	Cont.	6-3 1/2 x 5	131	33x4 1/2	12975	13295	2575	3755	3830	...	...
Chevrolet	490	Own.	4-3 1/2 x 4	110	33x4	975	975	1575	1575	Pan American E&F	6-55	H-S.	6-3 1/2 x 5	121	33x4	2000	2000	2100	...	...	...	...
Cleveland	40	Own.	6-3 x 4 1/2	112	32x4	1295	1295	2195	2295	Parenti	1921	Own.	8-2 1/2 x 4 1/2	125	32x4	2000	2000	3000	3000	...	...	...
Climber Four	H-S.	4-3 1/2 x 5	115	33x4	1450	1385	...	...	...	Patterson	650	Cont.	6-3 1/2 x 4 1/2	120	33x4	1595	1625	2895	2895	...	...	...
Climber Six	S	H-S.	6-3 1/2 x 5	125 1/2	32x4 1/2	2250	2250	...	...	Peerless	56-S-7	Own.	8-3 1/2 x 5	125	32x4 1/2	2880	2880	3500	3790	...	...	...
Cole	870	Cont.	8-3 1/2 x 4 1/2	127	33x5	2550	2695	3695	3995	Pedmont	46	Own.	4-3 1/2 x 5	116	32x3 1/2	385	385	...	...	...	...	...
Columbia	Challenger	Rut.	6-3 1/2 x 5	115	32x4	1195	1195	1995	1995	Piedmont	46	Lyc.	4-3 1/2 x 5	116	32x3 1/2	...	...	...	...	...	...	...
Columbia	D-C&CS	Cont.	6-3 1/2 x 4 1/2	115	32x4	1475	1475	2350	2350	Piedmont	46	Own.	6-3 1/2 x 4 1/2	122	32x4	1285	1285	...	...	...	...	...
Comet	C-53	Cont.	6-3 1/2 x 5 1/2	125	33x4 1/2	2350	2450	3650	3650	Pierce-Arrow	...	Own.	6-4 x 5 1/2	128	33x5	7600	7600	8000	8500	...	...	...
Commonwealth	44	H-S.	4-3 1/2 x 5	117	32x4	1395	1395	2465	2465	Pilot	6-5	Teetor	6-3 1/2 x 5	110	32x4	1945	1945	...	...	...	...	...
Crawford	21-60	Cont.	6-3 1/2 x 5 1/2	122 1/2	32x4	3000	3000	4500	4500	Pilot	6-50	H-S.	6-3 1/2 x 5	116	32x4	2285	2285	3350	3400	...	...	...
Crow-Elkhart	163-65	Lyc.	4-2 1/2 x 5 1/2	117	32x3 1/2	1295	1295	...	...	Porter	6-0	Own.	4-4 x 6 1/2	142	35x5	6750	Chassis Price	...	...	...	...	...
Crow-Elkhart	563-65	H-S.	6-3 1/2 x 5	117	33x4	1545	1545	2395	2395	Premier	6-D	Own.	6-3 1/2 x 5 1/2	126 3/8	33x5	3790	3690	3890	4690	5190	...	...
Daniels	D-19	Own.	8-3 1/2 x 5 1/2	132	34x4 1/2	5350	5350	6250	6950	Premocor	6-40 A	Falls.	6-3 1/2 x 4 1/2	117	33x4	1295	1295	...	...	...	...	...
Davis	61-67	Cont.	120	32x4	1995	1895	1995	2795	2795	Raleigh	A-6-60	H-S.	6-3 1/2 x 5	122	32x4 1/2	2250	2250	3100	3200	...	...	...
Dispatch	Wisc.	4-3 1/2 x 5	120	34x4	1250	1350	1525	1575	1575	R & V Knight	R	Own.	4-3 1/2 x 5	116	32x4	2150	2150	2850	2950	...	...	...
Dixie Flyer	H-S-70	H-S.	4-3 1/2 x 5	112	32x4	1445	1445	1945	2345	R & V Knight	R	Own.	6-3 1/2 x 4 1/2	127	32x4 1/2	3350	3350	4000	4200	...	...	...
Dodge Brothers	...	Own.	4-3 1/2 x 4 1/2	114	32x4	935	985	1565	1785	Reo	T-6	Own.	6-3 x 5	120	33x4	1650	1650	2700	2750	...	...	...
Doris	6-80	Own.	6-4 x 5	132	33x5	...	...	5800	6690	Reo	T-6	Own.	4-4 1/2 x 6	131	32x4 1/2	4550	4550	6500	6500	...	...	...
Dort	17-12	D-Ly.	4-3 1/2 x 5	108	31x4	985	985	1535	1685	Rever	...	C Dues.	6-3 1/2 x 5 1/2	128	32x4 1/2	2750	2750	3850	3950	...	...	...
Driggs	...	Own.	4-2 1/2 x 4 1/2	104	30x3 1/2	1275	1275	1975	1975	Rosmer	6-54 E	Cont.	6-3 1/2 x 5 1/2	128	32x4 1/2	2750	2750	3850	3950	...	...	...
Dupont	A	Own.	4-3 x 5 1/2	124	32x4 1/2	3400	3400	4900	4900	Roamer	4-75 E	Dues.	4-4 1/2 x 6	128	32x4 1/2	3850	3850	...	...	...	...	...
Durant	A-22	Cont.	4-3 1/2 x 4 1/2	109	31x4	890	890	1365	1365	Rolls-Royce	...	Own.	6-4 1/2 x 6 1/2	143 1/2	33x5	U. S. Chassis Price	11750	11750	2450	2750
Eclair	K-4	Lyc.	4-3 1/2 x 5	117	33x4	1195	1195	Romer	...	Cont.	6-3 1/2 x 4 1/2	120	33x4	2000	2000	2100	2450	2750
Eclair	7-R	Cont.	6-3 1/2 x 4 1/2	117	33x4	1595	1595	2395	2495	Saxon	125	Own.	4-3 1/2 x 5	112	32x4	1545	1495	2295	2295	...	...	...
Elgin	K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1595	1495	2395	2395	Sayers Six	DP	Cont.	6-3 1/2 x 4 1/2	118	33x4	1945	1945	2995	2995	...	...	...
Essex	...	Own.	4-3 1/2 x 5	108 1/2	32x4	1375	1375	1880	2230	Scripps-Booth	B-39-42	Nort.	6-2 1/2 x 4 1/2	115	32x4	1275	1295	1950	2100	...	...	...
Fergus	S-5-21	Own.	6-3 1/2 x 5	126	33x4 1/2																		

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason	1 1/2	\$1650	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	W	Corbitt, D	1 1/2	\$2600	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Gary, F	1	\$2100	3 1/2 x 5 1/2	36x3 1/2	36x4	W
Acason, R	1 1/2	2260	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Corbitt, C	1 1/2	3150	4 1/2 x 5 1/2	36x3 1/2	36x7	W	Gary, I	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2	36x5	W
Acason, RB	1 1/2	2485	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Corbitt, B	2 1/2	3300	4 1/2 x 5 1/2	36x4	36x7	W	Gary, J	2 1/2	3150	4 1/2 x 5 1/2	36x4	36x7	W
Acason, H	2 1/2	3295	4 1/2 x 5 1/2	36x4	36x8	W	Corbitt, A	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	W	Gary, K	3 1/2	4050	4 1/2 x 5 1/2	36x5	40x5 1/2	W
Acason, L	3 1/2	4295	4 1/2 x 5 1/2	36x5	36x10	W	Corbitt, AA	5	5000	4 1/2 x 5 1/2	36x6	40x6 1/2	W	Gary, M	5	5150	5 x 6 1/2	36x6	40x6 1/2	W
Acason, M	5	5250	5 x 6 1/2	36x6	40x12	W	Cyclone A	1 1/2	2685	3 1/2 x 5 1/2	34x5 1/2	36x7	I	Gersix M	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2	36x7	W
Ace, C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Dart, S	1 1/2	....	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Gersix K	1 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W
Ace, A	2 1/2	2795	4 1/2 x 5 1/2	36x4	36x7	W	Dart, M	2 1/2	....	4 1/2 x 5 1/2	36x4	36x7	W	Giant, 15-A	3 1/2	4500	4 1/2 x 5 1/2	36x5	40x12	W
Acme, G	1 1/2	....	3 1/2 x 5 1/2	35x5 1/2	35x7	W	Day, W	3 1/2	....	4 1/2 x 5 1/2	36x5	36x10	W	Giant, 16	1 1/2	2250	3 1/2 x 5 1/2	34x3 1/2	34x5	W
Acme, B	1 1/2	....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Day-Elder, A	1	2100	3 1/2 x 5 1/2	34x3 1/2	34x4	W	Giant, 17	2	3050	4 1/2 x 5 1/2	36x4	36x7	W
Acme, F	1 1/2	....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Day-Elder, B	1 1/2	2300	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Globe D-20	3 1/2	4150	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Acme, A	2 1/2	....	4 1/2 x 5 1/2	36x4	36x7	W	Day-Elder, D	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	Globe	1	1495	3 1/2 x 5 1/2	33x3 1/2	33x4 1/2	B
Acme, AC	3 1/2	....	4 1/2 x 5 1/2	36x5	40x10	W	Day-Elder, E	3 1/2	3025	4 1/2 x 5 1/2	36x4	36x7	W	Golden West, GH	3 1/2	5000	4 1/2 x 5 1/2	36x7	36x7	W
Acme, C	3 1/2	....	4 1/2 x 5 1/2	36x5	40x10	W	Day-Elder, F	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5 1/2	W	Golden West, G	3 1/2	4500	4 1/2 x 5 1/2	36x6	36x6	W
Acme, E	6	....	4 1/2 x 5 1/2	36x6	40x12	W	Day-Elder, G	5	4250	4 1/2 x 5 1/2	36x5	40x6 1/2	W	Golden West, H	3 1/2	5000	4 1/2 x 5 1/2	36x6	36x6	W
Akr-Nulti-Trk20	1	1995	4 x 5 1/2	34x5	34x5	B	Dearborn, E	1	1700	3 1/2 x 5 1/2	35x5 1/2	35x7 1/2	W	Golden West, T	4	5500	4 1/2 x 5 1/2	36x6	36x6	W
All-Power, C	3 1/2	5800	4 1/2 x 5 1/2	36x7	36x10	W	Dearborn, FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Golden West, K	7	6000	4 1/2 x 5 1/2	36x6	36x6	W
All-American, B-1	1	1795	3 1/2 x 5 1/2	32x4	32x4	I	Dearborn, F	1 1/2	2180	3 1/2 x 5 1/2	34x4	34x5	W	Gove, A-1	2 1/2	2495	3 1/2 x 5 1/2	35x5 1/2	35x7 1/2	I
All-American C-1	1 1/2	2195	3 1/2 x 5 1/2	34x4	34x5	I	Dearborn, 48	2	2590	3 1/2 x 5 1/2	35x5 1/2	34x7 1/2	W	Graham Bros., 10	1 1/2	1495	3 1/2 x 5 1/2	34x3 1/2	34x5 1/2	I
American, 25	2 1/2	3350	4 x 6	36x4	36x4 1/2	W	Defiance, G	1 1/2	1975	3 1/2 x 5 1/2	35x5 1/2	35x7 1/2	W	Gramm-Bern, 15	1 1/2	2050	3 1/2 x 5 1/2	36x3 1/2	36x5	W
American, 40	4	4275	4 1/2 x 6	36x5	36x5 1/2	W	Defiance, D	1 1/2	2550	3 1/2 x 5 1/2	35x5 1/2	36x6 1/2	W	Gramm-Bern, 65	1 1/2	2725	3 1/2 x 5 1/2	36x4	36x7	W
Apex, G	1 1/2	1450	3 1/2 x 5 1/2	34x3 1/2	34x5	I	Defiance, E	2 1/2	2750	3 1/2 x 5 1/2	35x5 1/2	35x7 1/2	W	Gramm-Bern, 20	2 1/2	3175	4 1/2 x 5 1/2	36x4	36x7	W
Apex, D	1 1/2	1915	3 1/2 x 5 1/2	34x3 1/2	34x4	I	DeKalb, E2 1/2	2 1/2	2600	4 1/2 x 5 1/2	36x4	36x6	W	Gramm-Bern, 25	2 1/2	3575	4 1/2 x 5 1/2	36x4	36x7	W
Apex, E	2 1/2	2095	4 1/2 x 5 1/2	36x4	36x7	I	DeKalb, E2	2 1/2	2250	4 1/2 x 5 1/2	34x3 1/2	36x5	W	Gramm-Bern, 35	3 1/2	4375	4 1/2 x 5 1/2	36x5	40x5 1/2	W
Apex, F	3 1/2	3975	4 1/2 x 6	36x5	36x10	I	DeMartini 1 1/2	1 1/2	2600	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Gramm-Bern, 50	5	5275	4 1/2 x 5 1/2	36x6	40x6 1/2	W
Armleder, 20	1	....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	DeMartini 2	2	3300	4 x 5 1/2	36x3 1/2	36x7	W	Hahn, J4	1	....	3 1/2 x 5 1/2	34x5	34x5	W
Armleder, HW	2 1/2	....	4 1/2 x 5 1/2	36x4	36x7	W	DeMartini 3	3	4250	4 1/2 x 5 1/2	36x4	36x10	W	Hahn, CD	1 1/2	....	4 1/2 x 5 1/2	36x3 1/2	36x6	W
Armleder, KW	3 1/2	....	4 1/2 x 5 1/2	36x5	36x5 1/2	W	DeMartini 4	4	4800	4 1/2 x 5 1/2	36x5	36x12	W	Hahn, EE	2 1/2	....	4 1/2 x 5 1/2	36x4	36x8	W
Atco, B	1 1/2	....	3 1/2 x 5 1/2	34x5 1/2	34x6 1/2	W	Denby, 31	1 1/2	1625	3 1/2 x 5 1/2	35x5	35x5 1/2	B	Hahn, F	2 1/2	....	4 1/2 x 5 1/2	36x5	36x10	W
Atco, B1	1 1/2	....	3 1/2 x 5 1/2	34x5 1/2	34x6 1/2	W	Denby, 33	2 1/2	2300	3 1/2 x 5 1/2	35x5 1/2	35x7 1/2	I	Hahn, EF	5	....	4 1/2 x 5 1/2	36x6	40x12	W
Atco, A	2 1/2	....	4 1/2 x 5 1/2	36x4	36x8	W	Denby, 34	2	2600	3 1/2 x 5 1/2	36x3 1/2	36x6	I	Hal Fur, E	1	2350	4 x 5	35x5 1/2	35x7 1/2	W
Atlas, M.D	1	....	3 1/2 x 5 1/2	32x4 1/2	32x4 1/2	W	Denby, 25	3	3300	4 1/2 x 5 1/2	36x4	36x7	I	Hal Fur, B	2 1/2	3250	4 1/2 x 5 1/2	36x6	40x10 1/2	W
Atterbury, 20R	1 1/2	2775	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Denby, 27	4	4200	4 1/2 x 5 1/2	36x5	36x5 1/2	W	Hal Fur, F	2 1/2	3100	3 1/2 x 5 1/2	34x5 1/2	34x7 1/2	W
Atterbury, 7CX	2 1/2	3375	4 1/2 x 5 1/2	36x4	36x4 1/2	W	Denby, 210	5	4850	4 1/2 x 5 1/2	36x6	40x6 1/2	I	Hall	1 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Atterbury, 7D	2 1/2	4175	4 1/2 x 5 1/2	36x5	40x5 1/2	W	Dependable, A	1 1/2	1650	3 1/2 x 5 1/2	34x5	36x6	W	Hall	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Atterbury, 8E	5	5575	4 1/2 x 6	36x5	40x6 1/2	W	Dependable, C	1 1/2	2350	3 1/2 x 5 1/2	34x5	36x6	W	Hall	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Autocar, 21UF	1 1/2	2300	4 1/2 x 4 1/2	34x4	34x5	D	Dependable, D	2 1/2	2650	4 x 5 1/2	34x5	36x6	W	Hall	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Autocar, 21UG	1 1/2	2400	4 1/2 x 4 1/2	34x4	34x5	D	Dependable, E	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W	Hall	5	5100	4 1/2 x 5 1/2	36x5	40x6 1/2	W
Autocar, 26Y	....	4350	4 1/2 x 5 1/2	34x6	36x12	D	Diamond-T, O	1	2500	3 1/2 x 5 1/2	34x5 1/2	36x6 1/2	W	Hall	7	5100	4 1/2 x 5 1/2	36x5	40x6 1/2	C
Autocar, 26-B	....	4500	4 1/2 x 5 1/2	34x6	36x12	D	Diamond-T, FS	1 1/2	2960	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Harvey, WEA	1 1/2	2550	4 1/2 x 5 1/2	34x3 1/2	34x5	W
Available, H1 1/2	1 1/2	2475	4 x 5 1/2	36x3 1/2	36x5	W	Diamond-T, T	1 1/2	2650	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Harvey, WFA	2 1/2	2950	4 1/2 x 5 1/2	34x4	34x7	W
Available, H2	2 1/2	2775	4 x 5 1/2	36x3 1/2	36x6	W	Diamond-T, U	2	3285	4 x 5 1/2	36x4	36x7	W	Harvey, WHA	3 1/2	3950	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Available, H2 1/2	2 1/2	3475	4 x 5 1/2	36x4	36x8	W	Diamond-T, K	3 1/2	4675	4 1/2 x 5 1/2	36x6	40x6 1/2	W	Harvey, WKA	5	4500	4 1/2 x 5 1/2	36x6	40x6 1/2	W
Available, H3 1/2	3 1/2	4475	4 1/2 x 5 1/2	36x5	40x5 1/2	W	Diamond-T, EL	5	5400	4 1/2 x 5 1/2	36x6	40x6 1/2	W	Hawkeye, K	1 1/2	1850	3 1/2 x 5 1/2	34x3 1/2	34x5	I
Available, H5	5	5375	4 1/2 x 6	36x6	40x12	W	Diamond-T, S	5	6550	4 1/2 x 5 1/2	36x6	40x6 1/2	W	Hawkeye, M	2 1/2	2650	4 1/2 x 5 1/2	36x4	36x6	W
Available, H7	7	6000	5 x 6																	

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Kelly-S., K-45	4	\$4550	4 1/2 x 6 1/2	36x5 36x5d	C	Ogden, E	2 1/2	\$3250	4 1/2 x 5 1/2	36x4 36x7	W	Service, 76	3 1/2	\$4485	4 1/2 x 6	36x5 36x5d	W
Kelly-S., K-50	5	4900	4 1/2 x 6 1/2	36x6 40x6d	C	Old Hickory, W	1	2175	3 3/4 x 5	36x3 1/2 36x4	W	Service, 161	5	5275	4 1/2 x 6	36x6 40x6d	W
Kelly-S., K-60	6	5100	4 1/2 x 6 1/2	36x6 40x7d	C	Old Reliable, A	1 1/2	2350	4 x 5	34x4 36x6	W	Signal, NF	1	2475	4 1/2 x 5	34x5 1/2 36x6 1/2	W
Keystone, 40	2	2150	3 3/4 x 5 1/2	34x5 1/2 38x7 1/2	I	Old Reliable, B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	Signal, H	1 1/2	2925	4 1/2 x 5 1/2	34x4 36x6	W
Kimball, AB	2	3675	4 x 6	36x4 36x7	W	Old Reliable, C	5	4250	4 1/2 x 6	36x5 36x5d	W	Signal, J	2 1/2	3275	4 1/2 x 5 1/2	34x4 36x8	W
Kimball, AC	2 1/2	3975	4 1/2 x 6	36x4 36x8	W	Old Reliable, D	5 1/2	5250	4 1/2 x 6	36x6 40x6d	W	Signal, M	3 1/2	4275	4 1/2 x 5 1/2	36x5 40x5d	W
Kimball, AK	3	4500	4 1/2 x 6	36x4 36x10	W	Old Reliable, KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7d	C	Signal, R	5	5300	4 1/2 x 6	36x6 40x6d	W
Kimball, AE	4	5000	4 1/2 x 6	36x5 40x12	W	Oldsmobile Econ.	1	1095	3 1/2 x 5 1/2	35x5 1/2 35x5 1/2	I	Southern, 10	1	2590	3 3/4 x 5	34x3 1/2 34x4	W
Kimball, AF	5	5975	5 x 6	36x6 40x7d	W	Olympic, A	2 1/2	3500	4 1/2 x 5 1/2	36x4 36x7	W	Southern, 15	1 1/2	2590	3 3/4 x 5 1/2	36x6 1/2 34x4	W
Kissel, Express	1	1985 1/2	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	W	Oneida, A-9	1 1/4	2350	3 3/4 x 5 1/2	36x3 1/2 36x5	W	Southern, 20	2	2990	4 1/2 x 5 1/2	36x6 1/2 40x8	W
Kissel, Utility	1 1/2	2775	3 1/2 x 5 1/2	36x3 1/2 36x5	W	Oneida, B-9	1 3/4	2915	4 x 5 1/2	36x4 36x7	W	Standard, 1-K	1-1 1/2	1950	3 3/4 x 5	34x3 1/2 34x5	W
Kissel, Freight	2 1/2	3475	4 1/2 x 5 1/2	36x4 36x7	W	Oneida, C-9	2 1/2	3390	4 x 5 1/2	36x4 36x7	W	Standard, 76	2 1/2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W
Kissel, H. D.	4	4475	4 1/2 x 5 1/2	36x5 36x5d	W	Oneida, D-9	3 1/2	4345	4 1/2 x 5 1/2	36x5 36x10	W	Standard, 66	3 1/2-4	4000	4 1/2 x 5 1/2	36x5 36x10	W
Kleiber, AA	1 1/2	2600	4 1/2 x 5 1/2	36x3 1/2 36x5	W	Orleans, A	1 1/2	5400	4 1/2 x 5 1/2	36x6 40x12	W	Standard, 5-K	3 1/2-4	4000	4 1/2 x 6	36x6 40x12	W
Kleiber, BB	2 1/2	3100	4 1/2 x 5 1/2	36x3 1/2 36x6	W	Orleans, B	2 1/2	2750	3 3/4 x 5 1/2	36x3 1/2 36x5	W	Sterling, 1 1/2	1 1/2	3200	4 x 5 1/2	36x3 1/2 36x5	W
Kleiber, B	2 1/2	3600	4 1/2 x 5 1/2	36x4 36x7	W	Orleans, C	2 1/2	3250	4 1/2 x 5 1/2	36x4 36x7	W	Sterling, 2	2	3500	4 x 5 1/2	36x4 36x6	W
Kleiber, C	2 1/2	3950	4 1/2 x 5 1/2	36x5 36x8	W	Orleans, D	3 1/2	3750	4 1/2 x 5 1/2	36x4 1/2 36x8	W	Sterling, 2 1/2	2 1/2	3670	4 1/2 x 5 1/2	36x4 36x4d	W
Kleiber, D	3 1/2	4600	4 1/2 x 5 1/2	36x5 36x5d	W	Orleans, E	5	4250	4 1/2 x 5 1/2	36x6 40x8	W	Sterling, 3 1/2	3 1/2	4050	4 1/2 x 5 1/2	36x5 40x5d	W
Koehler, D	5	5300	5 x 6 1/2	36x6 40x12	W	Oshkosh, A	2	3750	3 1/2 x 5	36x6 1/2 36x6 1/2	4	Sterling, 5-W	5	5500	5 x 6 1/2	36x6 40x6d	W
Koehler, M	1 1/2	1885	3 1/2 x 5	34x3 1/2 34x5	W	Oshkosh, AA	2	3850	3 1/2 x 5	36x6 1/2 36x6 1/2	4	Sterling, 5-C	5	6000	5 x 6 1/2	36x6 40x6d	C
Koehler, MCS	2 1/2	2875	4 x 5 1/2	36x4 36x7	W	Oshkosh, BB	2 1/2	4150	4 x 5 1/2	38x7 1/2 38x7 1/2	4	Sterling, 7 1/2	7 1/2	6500	5 x 6 1/2	36x6 40x7d	C
Koehler, F	3 1/2	2975	4 x 5 1/2	36x4 36x7	W	Packard, EC	...	4300	4 x 5 1/2	38x7 1/2 38x7 1/2	4	Stewart, 14	3 1/2	1395	3 3/4 x 5 1/2	32x4 1/2 32x4 1/2	I
Koehler, MT, Trac	3 1/2	3985	4 1/2 x 5 1/2	36x5 36x10	W	Packard, EF	...	3500	4 1/2 x 5 1/2	36x4 36x7	W	Stewart, 15	1	1875	3 1/2 x 5	35x5 1/2 35x5 1/2	I
L.C.C., 2-20	2 1/2	2975	4 x 5 1/2	36x4 36x7	W	Packard, EX	...	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 9	1 1/2	2200	3 3/4 x 5	34x3 1/2 34x5	I
Lange, B	2 1/2	2540	4 1/2 x 5 1/2	36x4 36x4d	I	Packard, FX	...	4500	5 x 5 1/2	36x6 1/2 40x6d 1/2	W	Stewart, 7	2	2800	4 1/2 x 5 1/2	34x4 34x7	I
Larrabee, XZ	1 1/2	3350	4 1/2 x 5 1/2	36x4 36x6	C	Paige, 52-19	1 1/2	4000	4 1/2 x 5 1/2	36x6 1/2 40x8 1/2	W	Stewart, 7-X	2 1/2	2950	4 1/2 x 5 1/2	34x4 34x7	I
Larrabee, U	1 1/2	1925	3 1/2 x 4 1/2	34x5 1/2 34x5 1/2	B	Paige, 54-20	1 1/2	2880	4 x 5 1/2	34x4 1/2 34x5	W	Stewart, 10	3 1/2	3850	4 1/2 x 5 1/2	36x5 36x5d	I
Larrabee, SK	2 1/2	2400	4 1/2 x 5 1/2	34x3 1/2 34x5	B	Paige, 51-18	2 1/2	3100	4 1/2 x 5 1/2	34x4 34x8	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 5 1/2	36x5 36x5d	I
Larrabee, FL	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W	Parker, F20	3 1/2	4255	4 1/2 x 5 1/2	36x5 36x5d	W	Stoughton, A	1	1995	3 3/4 x 5 1/2	34x4 1/2 35x5 1/2	W
Larrabee, FW	3	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Parker, J20	3 1/2	3500	4 x 6	34x4 36x4d	W	Stoughton, B	1 1/2	2350	3 3/4 x 5 1/2	36x3 1/2 36x5	W
Lion, L	5	4800	4 1/2 x 6	36x6 40x6d	W	Parker, M20	5	4400	4 1/2 x 6	36x5 40x5d	W	Stoughton, C	3 1/2	1240	3 1/2 x 5	31x4 1/2 31x4 1/2	W
Luedinghaus, C	1	2350	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Patriot, Revere	5	5500	4 1/2 x 6	36x6 40x6d	W	Stoughton, D	2	2800	4 x 5 1/2	36x4 36x7	W
Luedinghaus, W	1 1/2	2100	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Patriot, Lincoln	1 1/2	1785	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Stoughton F	3	3600	4 1/2 x 5 1/2	36x5d 36x5d	W
Luedinghaus, M	1 1/2	2700	3 1/2 x 5 1/2	34x3 1/2 34x5	W	Piedmont, 4-30	2 1/2	2450	4 x 5 1/2	34x3 1/2 34x5	W	Sullivan, E	2	3350	4 1/2 x 5 1/2	36x4 36x7	W
Luedinghaus, L	2 1/2	3150	4 1/2 x 5 1/2	36x4 36x7	W	Pierce-Arrow	2 1/2	3150	4 1/2 x 5 1/2	36x4 36x7	W	Sullivan, H	3 1/2	4650	4 1/2 x 6	36x5 36x5d	W
Maccari, L	1 1/2	2925	4 1/2 x 5 1/2	36x4 36x6	W	Pierce-Arrow	2 1/2	1685	3 1/2 x 5	34x4 1/2 34x4 1/2	W	Superior, D	1	1650	3 1/2 x 5	34x4 1/2 34x4	I
Maccari, H-2	2 1/2	3650	4 1/2 x 5 1/2	36x4 36x4d	W	Pierce-Arrow	2 1/2	3200	4 x 5 1/2	36x4 36x4d	W	Superior, E	2	2600	4 1/2 x 5 1/2	36x4 36x6	I
Maccari, M-2	2 1/2	4500	4 1/2 x 5 1/2	36x5 36x5d	W	Pierce-Arrow	2 1/2	4350	4 1/2 x 5 1/2	36x5 36x5d	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4 36x8	W
Maccari, G	5	5500	4 1/2 x 6	36x5 40x6d	W	Pioneer, 59	5	4850	4 1/2 x 6	36x5 40x6d	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5 40x5d	W
MacDonald, A	7 1/2	5750	4 1/2 x 6	40x7 40x14	I	Pittsburgh, C-21	2 1/2	1550	3 3/4 x 4 1/2	32x4 1/2 32x4 1/2	I	Super Truck, 100	5	5300	4 1/2 x 6	36x5 40x12	W
Mack, AB D.R.	1 1/2	3450	4 x 5	36x4 36x3 1/2	D	Pony	3 1/2	3500	4 1/2 x 5 1/2	36x5 36x7	W	Super Truck 150	7 1/2	6300	5 x 6	36x6 40x7d	W
Mack, AB Chain	1 1/2	3400	4 x 5	36x4 36x4d	C	Power, F	1 1/2	400	2 1/2 x 4	28x3 1/2 28x3 1/2	C	Texas, A38	3 1/2	1095	3 1/2 x 5	33x4 33x4	I
Mack, AB Chain	1 1/2	3000	4 x 5	36x4 36x3 1/2	C	Power, G	1 1/2	...	3 3/4 x 5 1/2	36x6 36x6	W	Texas, TK39	1 1/2	1550	3 1/2 x 5	36x6 36x7	W
Mack, AB D.R.	2	3750	4 x 5	36x4 36x4d	D	Premcar, B-143	1 1/2	...	3 3/4 x 5 1/2	36x5 40x10	W	Tiffin, GW	1 1/2	2400	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack, AC Chain	3 1/2	4050	5 x 6	36x5 40x5d	C	Rainier, R-11	2 1/2	2175	3 1/2 x 5	36x6 36x6 1/2	W	Tiffin, MW	2 1/2	3100	4 1/2 x 5 1/2	36x4 26x3 1/2	W
Mack, AC Chain	6 1/2	5500	5 x 6	36x6 40x6d	C	Rainier, R-19	1	2350	3 1/2 x 5	36x5 35x5 1/2	W	Tiffin, PW	2 1/2	4100	4 1/2 x 5 1/2	36x5 40x5d	W
Mack, AC Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Rainier, R-16	1 1/2	2600	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin, F50	5	4800	4 1/2 x 6	36x6 40x6d	W
Mack, AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Rainier, R-18	2	2950	4 1/2 x 5 1/2	34x4 34x6	W	Titan, HT	3 1/2	4550	4 1/2 x 6	36x6 40x12	W
Mack Trac, AB	5	3400	4 x 5	36x4 36x4d	C	Rainier, R20	2 1/2	3600	4 1/2 x 5 1/2	34x4 34x7	W	Titan, HD	5	5100	4 1/2 x 6	36x5 40x6d	I
Mack Trac, AC	7	4950	5 x 6	36x5 40x5d	C	Rainier, R-15	3 1/2	4500	4 1/2 x 5 1/2	36x5 36x5d	W	Titan, TS	3 1/2	3400	4 1/2 x 6	36x4 36x4d	I
Mack Trac, AC	10	5500	5 x 6	36x6 40x6d	C	Rainier, R17	5	5250	4 1/2 x 6	36x6 36x6d	W	Tower, J	1 1/2	3000	4 1/2 x 5 1/2	35x5 38x7	W
Mack Trac, AC	13	5750	5 x 6	36x6 40x12	C	Ranger, TK-20-2	2	...	3 3/4 x 5	36x6 36x6 1/2	W	Tower, H	2 1/2	3475	4 1/2 x 5 1/2	36x4 36x7	W
Mack Trac, T	15	6000	5 x 6	36x7 40x7d	C	Reo, F	4-1 1/2	1385	4 1/2 x 4 1/2	34x4 1/2 34x4 1/2	I	Tower, G	3 1/2	4400	4 1/2 x 5 1/2	36x5 36x5d	W
Mapleleaf, AA**	2	4150	4 x 5 1/2	36x4 36x7	W	Reliance, 10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Traffic, C	...	1595	3 1/2 x 5	34x3 1/2 34x5	I
Mapleleaf, BB**	3	4775	4 1/2 x 5 1/2	36x4 36x4d	W	Reliance, 20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Traffic	...	1895	3 1/2 x 5	34x3 1/2 36x7	I
Mapleleaf, CC**	4	5770	4 1/2 x 5 1/2	36x5 36x5d	W	Republic, 75	1 1/2	1395 1/2	3 1/2 x 5	32x4 1/2 32x4 1/2	I	Transport, 20	1	1395	3 1/2 x 5 1/2	34x3 1/2 34x4	I
Mapleleaf, DD**	5	6825	4 1/2 x 5 1/2	36x6 40x6d	W	Republic, 10	1	1695	3 1/2 x 5	35x5 1/2 35x5 1/2	I	Transport, 30	1 1/2	1995	3 1/2 x 5 1/2	36x3 1/2 36x5	I
Master, JW	1 1/2	2690	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Republic, 10Exp. 11	1	2095	3 1/2 x 5	35x5 1/2 35x5 1/2	I	Transport, 50	2 1/2	2785	4 1/2 x 5 1/2	36x4 36x7	I
Master, W	2 1/2	3290	4 1/2 x 5 1/2	34x4 36x7	W	Republic, 11X	1 1/2	2295	3 1/2 x 5	34x3 1/2 34x5	I	Transport, 70	3 1/2	3855	4 1/2 x 5 1/2	36x5 36x10	I
Master, D	2 1/2	3540	4 1/2 x 5 1/2	34x4 36x7	D	Republic, 19	2 1/2	2795	4 1/2 x 5 1/2	36x4 86x7	I	Traylor, B	1 1/2	2390	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Master, A	3 1/2	4190	4 1/2 x 6	36x5 40x5d	W	Republic, 20	2 1/2	3845									

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear							
Watson, B	1	\$1865	3 1/2 x 5 1/2	35x5 1/2 35x5 1/2	W	Wichita, S	5	\$5000	4 1/2 x 6	36x6 40x6d	W	Winther, 39	1 1/2	\$2450	3 1/2 x 5	34x3 1/2 34x5	I
Watson, N	3 1/2	4250	4 1/2 x 5 1/2	36x5 36x10	W	Wilcox, AA	1	2100	3 1/2 x 5 1/2	36x4 36x4	W	Winther, 49	2	3250	4 x 5	34x4 34x4d	I
Western, W1 1/2	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2 36x5	W	Wilcox, B	1 1/2	2775	4 1/2 x 5	36x4 36x5	W	Winther, 50	2 1/2	3905	4 x 6	38x7 42x9 1/2	I
Western, W2 1/2	2 1/2	2550	3 1/2 x 5	36x3 1/2 36x5	W	Wilcox, D	2 1/2	3300	4 1/2 x 5	36x4 36x3 1/2	W	Winther, 70	3 1/2	4200	4 x 6	36x5 36x5d	I
Western, W3 1/2	3 1/2	3250	4 1/2 x 5 1/2	36x4 36x7	W	Wilcox, E	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Winther, 450	2 1/2	3690	4 x 6	34x5 36x6	I
Western, W4 1/2	4 1/2	4250	4 1/2 x 6	36x5 40x5d	W	Wilcox, F	5	5200	4 1/2 x 6 1/2	36x5 40x6d	W	Winther, 109	5	5250	4 1/2 x 6	36x6 40x5d	I
White, 15	1 1/2	2400	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	W	Wilson, F	1 1/2	2270	3 1/2 x 5	36x3 1/2 36x5	W	Winther, 140	7	5900	5 x 6	36x6 40x7d	I
White, 20	2	3250	3 1/2 x 5 1/2	36x4 36x7	D	Wilson, EA	2 1/2	2825	4 1/2 x 5 1/2	36x4 36x7	W	Wisconsin B	1	1950	4 x 5 1/2	34x5 1/2 34x5 1/2	W
White, 40	3 1/2	4200	4 1/2 x 5 1/2	36x5 40x5d	D	Wilson, G	3 1/2	3685	4 1/2 x 5 1/2	36x5 36x5d	W	Wisconsin C	1 1/2	2500	4 1/2 x 5 1/2	36x6 36x6 1/2	W
White, 45	5	4500	4 1/2 x 5 1/2	36x6 40x6d	D	Wilson, H	5	4520	4 1/2 x 6	36x6 36x5d	W	Wisconsin D	2 1/2	3500	4 1/2 x 6 1/2	36x6 36x10	W
White Hick., E	1	2450	3 1/2 x 5	34x5 1/2 34x5 1/2	W	Winther, 751	1 1/2	1795	3 1/2 x 5	34x4 1/2 35x5 1/2	I	Wisconsin E	3 1/2	4000	5 x 6 1/2	36x6 36x12 1/2	W
White Hick., H	1 1/2	2750	3 1/2 x 5	34x5 1/2 34x5 1/2	W	Winther, 430	1 1/2	2850	3 1/2 x 5	32x4 32x4	I	Witt-Will, N	1 1/2	2750	3 1/2 x 5	36x3 1/2 36x5	W
White Hick., K	2 1/2	3350	4 1/2 x 5 1/2	36x4 36x5	W							Wolverine, J	1 1/2	2125	3 1/2 x 5	34x3 34x4	I
Wichita, E	1	2300	3 1/2 x 5 1/2	36x3 1/2 36x4	W							Wolverine, J	1 1/2	2375	3 1/2 x 5	34x3 34x5	I
Wichita, L	1 1/2	2600	3 1/2 x 5 1/2	36x3 1/2 36x5	W							Wolverine, J	2	2640	3 1/2 x 5	34x4 34x7	I
Wichita, M	2	2800	3 1/2 x 5 1/2	36x3 1/2 36x6	W							Wolverine, J	2 1/2	3425	3 1/2 x 5	36x5 36x10	I
Wichita, R	2 1/2	3000	3 1/2 x 5 1/2	36x4 36x7	W							Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	36x5 36x10	I
Wichita, RX	2 1/2	3600	3 1/2 x 5	36x4 36x8	W							Yellow Cab M21	3 1/2	2050	3 1/2 x 5	32x4 32x4	B
Wichita, O	3 1/2	4000	4 1/2 x 6	36x5 36x5d	W							Yellow Cab M41	1 1/2	2350	3 1/2 x 5	34x4 1/2 34x4 1/2	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.
 Final Drive: W—Worm, I—Internal Gear, C—Chain, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic. ‡Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	16-30	\$1975	3	Clim.	4-5 x 6 1/2	GDK	3-4	Gray.....1920	18-36	\$2000	3	Wauk	4-4 1/2 x 6 1/2	Gas.	4	Port Huron. A	12-25	\$1700	4	Chief	4-4 1/2 x 6	G,K	3
Allis-Chalm. B	6-12	925	2	LeR.	4-3 1/2 x 5 1/2	Gas.	1-2	Ground Hog	19-31	2000	4	Erd.	4-4 x 6	GorK	3	Prairie Dog. L	9-18	650	3	Wauk	4-3 1/2 x 5 1/2	Gas.	2
Allis-Chal. G.P	6-12	850	2	LeR.	4-3 1/2 x 5 1/2	Gas.	1-2	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K.	4	Prairie Dog.. D	15-30	1250	4	Wauk	4-4 1/2 x 6 1/2	Gas.	3
Allis-Chalm. L	12-20	1495	2	Mid.W	4-4 1/2 x 6 1/2	Gas.	2-3	Hart-Parr. 20	20	905	4	Own	2-5 1/2 x 6 1/2	K,D	2	Ranger Cul.	8-16	1000	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1
Allis-Chalm. T	18-20	2150	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Hart-Parr. 30	30	1595	4	Own	2-6 1/2 x 7	K,D	3	Reed.....A-1	15-30	1985	4	Wauk	4-4 1/2 x 6 1/2	GorK	3-4
Allis-Chalm. W	10-18	875	4	Own	4-4 1/2 x 6 1/2	G,K	4	Heider.....D	9-16	1170	4	Wauk	4-4 1/2 x 5 1/2	G,K	2	Reed.....A-1	18-36	2185	4	Wauk	4-5 x 6 1/2	Gas.	4
Allwork...2-G	14-28	1875	4	Own	4-5 x 6	GorK	3	Heider.....C	12-20	1395	4	Wauk	4-4 1/2 x 6 1/2	G,K	3	Reliable.....	10-20	885	4	Own	2-6 x 7	Ker.	3
Allwork...C	14-28	1675	4	Own	4-5 x 6	GorK	3	Heider.....Cult	6-10	1050	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Reliable.....	12-25	1600	4	Wauk	4-4 1/2 x 5 1/2	GorK	3
Andrews Kin.D	18-36	2500	4	Clim.	4-5 x 6 1/2	G,K	2-3	Hicks.....	20-30	1185	4	Wauk	4-4 1/2 x 6	GorK	3	Rex.....	12-24	1500	4	Own	4-4 1/2 x 5 1/2	GorK	2-3
Appleton	12-20	550	4	Own	1-4 1/2 x 5	Gas.	1	Huber Light 4	12-25	1185	4	Wauk	4-4 1/2 x 5 1/2	GorK	3	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	GorK	3-4
Aro.....1921	3-5	550	4	Clim.	4-5 x 6 1/2	G,K	4	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	GorK	4-5
Aultman-T.	15-30	2200	4	Own	4-5 1/2 x 6 1/2	G,K	6	Illinois Super	18-36	2375	4	Clim.	4-5 x 6 1/2	G,K	4	Russell.....	30-60	5000	4	Own	4-5 x 10	GorK	8-10
Aultman-T.	22-45	3850	4	Own	4-7 x 9	G,K,D	8	Imperial.....E	40-70	6000	4	Own	4-7 1/2 x 9	G,K,D	10	Samson.....M	10-20	1250	4	Nor	4-4 x 5 1/2	G,K	2
Aultman-T.	30-60	5000	4	Own	4-7 x 9	G,K,D	8	Indiana.....F	5-10	895	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 6 1/2	G,K,D	2
Automot. B-3.	12-24	1785	4	Own	4-3 x 4	G,K	2-3	International	8-16	900	4	Own	4-4 1/2 x 5	G,K,D	2	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4
Avery, SR, Cul.	5-10	1000	3	Own	4-3 x 4	G,K	2	International.	15-30	1750	4	Own	4-5 1/2 x 8	G,K,D	4	Shawnee Com.	6-12	1000	2	LeR.	4-3 1/2 x 4 1/2	Gas.	10
Avery.....B	5-10	1000	3	Own	4-3 x 4	G,K	2	J-T.....	20-40	3485	2	Chief	4-4 1/2 x 6	G,K,D	3-4	Shawnee Com.	9-18	1000	2	Gray	4-3 1/2 x 5	G,K	2
Avery.....C	8-16	1000	4	Own	2-5 1/2 x 6	G,K,D	2-3	Klumb.....F	16-32	1650	4	Clim.	4-5 x 6 1/2	Gas.	4	Shelby.....D	15-30	1000	4	Beav.	4-4 1/2 x 6	G,K	3
Avery.....	12-20	1000	4	Own	4-4 1/2 x 6	G,K,D	2-3	Knudsen, 1920	25-45	2500	4	Own	4-5 x 9	Gas.	4-6	Shelby.....C	10-20	885	4	Erd.	4-4 x 6	GorK	2-3
Avery.....	12-25	1000	4	Own	2-6 1/2 x 7	G,K,D	3-4	LaCrosse..M	6-12	650	4	Own	2-4 x 6	G,K	1	Short Turn.....	20-40	1500	3	Beav.	4-4 1/2 x 6	G,K	3
Avery.....	14-28	1000	4	Own	4-4 1/2 x 7	G,K,D	3-4	LaCrosse..G	12-24	985	4	Own	2-6 x 7	GorK	3	Square T.....A	18-35	2075	3	Clim.	4-5 x 6 1/2	G,K	3
Avery.....	18-36	1000	4	Own	4-5 1/2 x 6	G,K,D	4-5	Lauson.....	12-24	1495	4	Midw.	4-4 1/2 x 6 1/2	Gas.	3	Steady Pull.....	12-24	1485	4	Beav.	4-4 x 5	Gas.	3
Avery.....	25-50	1000	4	Own	4-6 1/2 x 7	G,K,D	5-6	Lauson.....	12-25	1495	4	Midw.	4-4 1/2 x 6 1/2	Gas.	3	Stinson.....4E	18-36	1835	4	Beav.	4-4 1/2 x 6	G,K	4
Avery.....	45-65	1000	4	Own	4-7 1/2 x 8	G,K,D	8-10	Lauson.....	15-25	1495	4	Beav.	4-4 1/2 x 6 1/2	GorK	3-4	Stone.....	20-40	2250	4	Beav.	4-4 1/2 x 6	G,K	4
Bates	15-25	1000	4	Own	4-4 1/2 x 6	Ker.	3	Lauson.....	15-25	1495	4	Beav.	4-4 1/2 x 6 1/2	GorK	3-4	Tioga.....3	15-27	2625	4	Wisc.	4-4 1/2 x 6	Gas.	3-4
Bates Mule. H	15-25	1000	4	Midw.	4-4 1/2 x 6 1/2	Gas.	3	Lauson.....21	15-30	1985	4	Beav.	4-4 1/2 x 6	GorK	3-4	Titan.....	10-20	900	4	Own	2-6 1/2 x 8	G,K,D	3
Bates Mule. F	18-25	1000	4	Midw.	4-4 1/2 x 6 1/2	Gas.	3	Lauson Road.	15-30	2225	4	Beav.	4-4 1/2 x 6	K.	3	Top.....B	30-45	3500	4	Wauk	4-4 1/2 x 6 1/2	Gas.	3-4
Bates Mule G	25-35	1000	4	Midw.	4-4 1/2 x 6 1/2	Gas.	3	Leader.....	12-18	1095	4	Own	2-6 x 6 1/2	G,K,D	2-3	Toro Cultivator	6-10	1000	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Bean.....	8-16	1000	4	Own	4-3 1/2 x 4	G,K	2-3	Leader.....N	16-32	1985	4	Clim.	4-5 x 6 1/2	G,K	3-4	Townsend	10-20	895	2	Own	4-6 1/2 x 7	Ker	2-3
Beeman.....G	2-4	315	1	Own	1-3 1/2 x 4 1/2	G,K	1/2	Leader.....GU	18-35	2775	2	Clim.	4-5 1/2 x 6 1/2	G,K	3-4	Townsend	15-30	1485	2	Own	4-7 x 8	Ker	3-4
Best	30	1000	2	Own	4-4 1/2 x 6 1/2	G,K,D	8-9	Leonard....E	20-30	2530	4	Buda	4-4 1/2 x 6	G,K	3	Townsend	25-50	2750	2	Own	4-8 1/2 x 10	Ker	4-8
Best	60	1000	2	Own	4-6 1/2 x 7 1/2	G,K,D	8-9	Liberty.....A	18-32	2475	4	Clim.	4-5 x 6 1/2	G,K	4	Tractor Motor	40-50	5000	4	Own	8-3 1/2 x 5	Gas.	4-5
Boring.....1921	15-30	1850	3	Wauk	4-4 1/2 x 6 1/2	GorK	2	Linn.....HAJ	40	5100	4	Wauk	4-4 1/2 x 5 1/2	Gas.	6	Traylor.....TB	6-12	715	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2
Burn-Oil. 1921	15-30	1650	4	Own	2-6 1/2 x 7	Ker.	3-4	Little Giant. B	16-22	2200	4	Own	4-4 1/2 x 5 1/2	Gas.	6	Triumph.....H	18-36	2450	4	Erd.	4-4 1/2 x 6	Ker.	4
Capital	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	Little Giant. A	26-35	3300	4	Own	4-5 1/2 x 6 1/2	G,K	16	Trundar.....10	25-40	3750	2	Wauk	4-5 x 6 1/2	GorK	4
Case	10-18	1090	2	Own	4-3 1/2 x 5 1/2	GorK	2	Lombard.....	85-150	3000	4	Own	4-5 1/2 x 6 1/2	G,K	16	Turner.....1921	14-25	1295	4	Buda	4-4 1/2 x 5 1/2	G,K	3
Case	15-27	1680	4	Own	4-4 1/2 x 6	GorK	3	Lombard.....	50	1000	2	Own	4-4 1/2 x 6 1/2	Gas.	6-10	Twin City.....	12-20	1580	4	Own	4-4 1/2 x 6	G,K	3
Case	22-40	3100	4	Own	4-5 1/2 x 6 1/2	GorK	4-5	Magnet.....B	14-28	1875	4	Wauk	4-4 1/2 x 6 1/2	K&G	1	Twin City.....	20-35	3175	4	Own	4-5 1/2 x 6 1/2	G,K	5
Caterpillar T11	25	4250	2	Own	4-4 1/2 x 6	Gas.	4	Master Jr.	5-10	585	2	LeR.	2-2 1/2 x 4	Gas.	1	Twin City.....	40-65	6250	4	Own	4-7 1/2 x 9	G,K	8
Caterpillar T16	40	6500	2	Own	4-6 1/2 x 7	GorK	4-5	Merry Gar1921	2	230	2	Ervin	2-2 1/2 x 4	Gas.	1	Uncle Sam C20	12-20	1385	4	Weid.	4-4 x 5 1/2	G	2-3
Centaur	5-2 1/2	455	2	NWay	2-4 1/2 x 4 1/2	GorK	1-9	Minne. All-P	12-25	1230	4	Own	4-4 1/2 x 7	GorK	3	Uncle Sam B19	20-30	2300	4	Beav.	4-4 1/2 x 6	GorK	3-4
Chas.	12-25	1725	3	Buda	4-4 1/2 x 5 1/2	GorK	2-3	Minne. Gen-P.	17-30	1850	4	Own	4-4 1/2 x 7	GorK	3-4	Uncle Sam D21	20-30	1985	4	Beav.	4-4 1/2 x 6	GorK	3-4
Chicago	40	2500	4	Own	4-4 1/2 x 6	Gas.	4	Minne.....	22-44	3300	4	Own	4-6 x 7	GorK	5-6	Universal.....	1-4	475	2	Own	1-3 1/2 x 5	G	1
Cletrac.....F	9-16	845	2	Own	4-3 1/2 x 4 1/2	G,K,D	2-3	Med.Duty	22-44	3300	4	Own	4-6 x 7	GorK	5-6	Utilitor.....301	4	380	2	Own	1-3 1/2 x 5 1/2	G	5-6
Cletrac.....W	12-20	1495	2	Own	4-4 x 5 1/2	G,K,D	2-3	Minne.....	35-70	4600	4	Own	4-7 1/2 x 9	GorK	8-9	Velie. Biltwell	12-24	1750	4	Own	4-4 1/2 x 5 1/2	G,K,D	3
Dakota.....4	15-27	1750	3	Dom.	4-4 1/2 x 6	Gas.	3	HeavyDuty	8-16	785	2	Light	4-3 1/2 x 4 1/2	GorK	2	Victory.....1921	9-18	1350	4	Gray	4-3 1/2 x 5	Gas.	2
Dart.....B.J.	15-30	2100	4	Buda	4-4 1/2 x 6	Gas.	3-4	Mohawk. 1921	8-16	785	2	Own	4-3 1/2 x 4 1/2	GorK	2-3	Victory.....1921	15-30	1750	4	Wauk	4-4 1/2 x 5 1/2	Gas.	3
Depue.....A	20-30	2500	4	Buda	4-4 1/2 x 6	Gas.	3-4	Moline Univ D	9-18	900	2	Own	4-3 1/2 x 5	Gas.	2-3	Vim.....B	15-30	1650	4	Wauk	4-4 1/2 x 5 1/2	G,K	3
Dill.....	20	2180	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	Moline Orch.	9-18	1075	2	Own	4-3 1/2 x 5	Gas.	2-3	Wallis.....K	15-25	1600	4	Own	4-4 1/2 x 5 1/2	G,K	3
Dill.....R.W.	20	2980	4	Midw	4-4 1/2 x 6	Gas.	3	Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	3-4	Waterloo..N	12-25	1450	4	Own	2-6 1/2 x 7	G,K	3
Do-It-All.....	-7	595	1	Own	1-4 1/2 x 5	Gas.	1	Motor.....	15-30	2250	4	Buda	4-4 1/2 x 6	Gas.	3-4	Webfoot.....53	23-53	5000	4	Wisc.	4-5 1/2 x 7	G,D	6
Eagle.....F	12-22	1100	4	Own	2-7 x 8	GorK	3-4	NB.....1	3-6	425	4	Own	2-3 1/2 x 4	Gas.	3/4	Wellington.B	12-22	900	4	Erd.	4-4 x 6	Ker.	2-3
Eagle.....F	16-30	1850	4	Own	2-8 x 8	GorK	4-5	Nichols-Shep.	20-42	3100	4	Own	8 x 10	GorK	3-6	Wellington.F	16-30	1400	4	Chief	4-4 1/2 x 6	Ker.	3-4
E.B.....AA	12-20	1445	4	Own	4-4 1/2 x 5	G,K,D	3	Nichols-Shep.	20-42	3100	4	Own	8 x 10	GorK	3-6	Western. 1920	16-32	2100	4	Clim.	4-5 1/2 x 6	Gas.	4
E.B.....Q	12-20	925	4	Own	4-4 1/2 x 5	G,K,D	3	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Wetmore.....	12-25	1650	4	Wauk	4-4 x 5 1/2	G,K	3
E-B.....	16-32	2000	4	Own	4-5 1/2 x 7	G,K,D	4	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Wharton.....E	12-20	1800	3	Buda	4-4 1/2 x 5 1/2	Gas.	2
Evans	18-30	2000	4	Buda	4-4 1/2 x 6	G,K	3	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Whitney.....	9-18	1000	4	Own	2-6 1/2 x 6 1/2	Gas.	2
Fageol.....D	9-12	1525	4	Lye.	4-3 1/2 x 5	Gas.	2	Nichols-Shep.	25-50	3460	4	Own	9 x 12	GorK	4-7	Whitney.....	9-18	1000	4	Own	2-6 1/2 x 6 1/2	Gas.	2
Farm Horse. B	18-30	18																					

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Kewanee, Ill.	Automobile Races, County Fair	Sept. 5 and 10
Byberry, Pa.	Phila. County Fair and Tractor Show	Sept. 5-10
Indianapolis	Automobile and Accessory Show	Sept. 6-10
Ottawa, Ont.	Automobile Show	Sept. 9 to 17
Waterloo	Automobile Show	Sept. 26-Oct. 2
New York	Electrical Exposition	Sept. 28-Oct. 8
Peoria, Ill.	National Implement and Vehicle Show	Sept. 30-Oct. 8
Cincinnati	Fall Automobile Show	Oct. 1-8
Oakland, Calif.	International Traffic Officers' Ass'n	Oct. 24 to 29
Omaha	International Automobile Congress	Nov. 3-5
Olympia, England	Automobile Show	Nov. 3-12
Jersey City	Second Annual Show	Nov. 14-19
Chicago	Automotive Equipment Show	Nov. 14-19
New York	Automobile Salon	Nov. 27-Dec. 3
Chicago	Automobile Salon	January, 1922
New York	National Automobile Show	Jan. 7-13, 1922
Chicago	National Automobile Show	Jan. 28-Feb. 3, 1922
Minneapolis	Tractor Show	Jan. 30 to Feb. 4, inclusive
Winnipeg, Canada	Canadian Automotive Equipment Ass'n Show	Feb. 6-11
Louisville, Ky.	Louisville Automobile Show	Feb. 20-25

RACES

Byberry, Pa.	Phila. County Fair	Sept. 10
Los Angeles	Speedway Race	Nov. 24

FOREIGN SHOWS

Buenos Aires, Argentina	Passenger Cars and Equipment	September
Luxemburg	Luxemburg Agricultural Sample Exhibition	September
Berlin	Automobile Show	Sept. 23-Oct. 2
Paris, France	Paris Motor Show	Oct. 5-16
London	British Motor Show, Motor Mfgs. and Traders	Nov. 4-11
Paris	Aviation Exhibition	Nov. 12 to 27
Santiago, Cuba	Annual Automobile Show	March, 1922
Rio de Janeiro, Brazil	Automotive Exhibition	September, 1922

CONVENTIONS

Detroit	Credit Convention Motor and Accessory Manufacturers' Ass'n	Sept. 14-16
Chicago	Twenty-eighth Annual Convention National Implement & Vehicle Association	Oct. 12-14
Cleveland	National Tire Dealers' Association	November
Chicago	Chicago Semi-Annual Convention of Factory Service Managers N. A. C. C.	Nov. 22-24
New York	Service Managers Convention	Nov. 22-24

SELECTS DURANT OAKLAND SITE

Oakland, Calif., Sept. 3.—R. C. Durant, president and general manager of the Durant Motor Co. of California, has definitely announced the site of the Durant assembly plant in Oakland. The site consists of 18 acres, on which will be built exclusively class A buildings, construction to be of concrete throughout. The main building will have a frontage of 600 ft. from which will run three wings, each extending 400 ft., forming courts. All building are to be of two stories.

SEIBERLING WON'T VERIFY RUMORS

Akron, Sept. 3.—F. A. Seiberling, former Goodyear president, says he has nothing to give out for publication upon his reported negotiations with C. H. Booth, receiver of the Republic Tire & Rubber Co., Youngstown, for rumored acquisition of the Republic plant.

It has been reported for some time that Seiberling planned acquisition of the Republic plant and the Marion Tire & Rubber Co. of Marion, O., which with the Lehigh Tire & Rubber Co., New Castle, Pa., and the Star Rubber Co., Akron,

would form the nucleus of a chain of rubber companies. Seiberling has assumed control of the Lehigh plant and

JOE BUSH

The SERVICE MAN

SAYS—



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ON'T refer to the customer's car as a piece of junk—at least, not when he's around.

it is now in operation. He has a large interest in the Star at Akron.

It is also reported that Seiberling interests will bid in the Marion plant if it is sold at a receiver's sale Oct. 3, as now scheduled by D. D. Grindle, Lima, referee in bankruptcy. Akron men are prepared, however, to meet with creditors and stockholders before the date of sale, and offer them a plan whereby the company's bankruptcy can be relieved and high-priced inventories utilized without heavy loss. Claims against the company now aggregate \$600,000.

OHIO DEALERS HOLD PICNIC

Columbus, O., Sept. 3.—The annual outing of the Columbus Automobile Trade Assn. was held at Spring Lake, about 5 miles southeast of Columbus, Aug. 25. A large crowd attended and various games and contests made up the program. One of the features was a horse-shoe pitching contest in which prizes were given to the winners. A dinner was served during the day and some speechmaking was indulged in. The committee on arrangements consisted of Frank J. Girard, Y. B. Jones, Fred Kaiser, A. I. Fishbaugh and J. L. Thompson.

NAMES LE MARNE CAR HOME

Toronto, Ont., Sept. 3.—The board of directors of the Anglo-American Motors, Ltd., has closed with the town of Trenton for the site for their plant, where it will build the "Le Marne" car.

The company will manufacture two types of automobiles—a four and an eight-cylinder model—both with enclosed bodies. The car will be Canadian-built throughout. It is proposed to sell the small four-cylinder car for \$975, and the eight for \$3,000.

DEALER FURNISHES EXPERT

San Francisco, Sept. 4.—H. L. Arnold, distributor for the Hudson and Essex in California, Nevada and Arizona, has introduced a new dealer cooperative feature which is proving of value in advancing the interests of the dealers throughout this territory. Arnold is sending E. B. Watson, mechanical expert, into each dealer's territory to see every Essex owner, go over his car, make such adjustments as may be necessary and coach the owner in getting the most possible out of the car. This is done without charge.

OPENS UNION TRUCK DEPOT

Sacramento, Sept. 3.—A union truck depot was opened in Sacramento Sept. 1 by the Lawrence Warehouse Co.

The union depot will eliminate six or eight private ones, and will reduce considerably the cost of doing business. It is located on the rail and water lines, so transportation by steamer or train of goods to be forwarded will be possible. Eight trucks will be able to load and unload at the same time. Motor trucks bring about 60 tons of freight into the city every day, the truck transportation men assert.